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In the Supreme Court of the United States

OCTOBER TERM, 1929.

No. 7, ORIGINAL.

STATE OF WISCONSIN, STATE OF MINNESOTA, STATE OF OHIO, AND STATE OF PENNSYLVANIA, COMPLAINANTS,

vs.

STATE OF ILLINOIS AND SANITARY DISTRICT OF CHICAGO, DEFENDANTS.

STATE OF MISSOURI, STATE OF KENTUCKY, STATE OF TENNESSEE, STATE OF LOUISIANA, STATE OF MISSISSIPPI, AND STATE OF ARKANSAS, INTERVENING DEFENDANTS.

No. 11, ORIGINAL.

STATE OF MICHIGAN, COMPLAINANT,

vs.

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No. 12, ORIGINAL.

STATE OF NEW YORK, COMPLAINANT,

vs.

STATE OF ILLINOIS AND SANITARY DISTRICT OF CHICAGO, DEFENDANTS.

BRIEF FOR COMPLAINANTS IN NOS. 7 AND 11 ORIGINAL, IN SUPPORT OF COMPLAINANTS' EXCEPTIONS AND IN OPPOSITION TO DEFENDANTS' EXCEPTIONS TO MASTERS' REPORT ON REREFERENCE.

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HISTORY AND STATEMENT OF CASE.

These original actions, numbered respectively 7, 11 and 12, were begun by the respective complainants during

the period extending from 1922 to 1926. Generally all of the Bills in the foregoing suits alleged great damage to the complainant States and their peoples by reason of the diversion of the waters of the Great Lakes-St. Lawrence Watershed by the State of Illinois and the Sanitary District of Chicago, and prayed that an injunction issue out of this Court to restrain said defendants from continuing such diversion, which was alleged to be unlawful. After motions to dismiss the bills of complaint in the respective suits had been severally overruled, the three cases, pursuant to orders of this Court and election of the parties in Nos. 11 and 12 Original, were consolidated and heard by Honorable Charles Evans Hughes, as Special Master.

Thereafter the Special Master duly filed his Report (hereinafter designated as Master's Original Report) in which he found that the diverson of water from the Great Lakes-St. Lawrence Watershed by said defendants had lowered the level of Lakes Michigan and Huron approximately six inches, the levels of Lake Erie and Ontario approximately five inches and the levels of connecting Rivers, Bays and Harbors to the same extent. (Master's Original Report, p. 104-5.) The Master further found that the extent of the lowering of said waters was in direct proportion to the extent of the diversion and that an increase of 1500 c.f.s. in the diversion would produce an additional lowering in said waters of approximately one inch. (Master's Original Report, p. 105.) As a result of this diversion, the Master found that the complainant States and their people had suffered substantial damage to their navigation and commercial interests, to structures, to the convenience of summer resorts, to fishing and hunting grounds, to public parks and other interests and to riparian property generally. (Master's Original Report, pp. 105-118.) The Master's finding in this respect was confirmed by this Court. *Wisconsin v. Illinois*, 278 U. S. 367 at 407-9.

Upon the consideration of the Master's Original Report and the exceptions filed thereto, this Court held in *Wisconsin, et al. v. Illinois, et al.*, 278 U. S. 367, that the diversion of water from the Great Lakes then and now being maintained by the State of Illinois and the Sanitary District of Chicago was unlawful and in violation of the rights of complainants, that the Sanitary District was under a legal duty to provide some other means of disposing of the sewage to the end that the unlawful diversion might be terminated, that in keeping with the principles of a Court of Equity, the defendants would be afforded a reasonable time within which to provide other means of disposing of the sewage and that thereafter there should be a final, permanent, operative and effective injunction.

Thereupon this Court again referred these causes to the Special Master for a determination of certain questions deemed to be essential to the formulation of an appropriate decree which, while avoiding unnecessary hazard to the health of the people of the Sanitary District, should nevertheless terminate the unlawful diversion and restore the rights of the complainants as speedily as possible. In that connection, Mr. Chief Justice Taft, speaking for the Court, said in part (278 U. S. 367 at 418-421):

> "It will be perceived that the interference which was the basis of the Secretary's permit, and which the latter was intended to eliminate, resulted directly from the failure of the Sanitary District to take care of its sewage in some other way than by promoting or continuing the existing diversion. It may be that some flow from the Lake is necessary to keep up navigation in the Chicago River, which really is part of the Port of Chicago, but that amount is negligible as compared with 8,500 second feet now being diverted. Hence, beyond that negligible quantity, the validity of the Secretary's permit derives its support entirely from a situation produced by the Sanitary District in violation of the complainants' rights; and but for that support

complainants might properly press for an immediate shutting down by injunction of the diversion, save any small part needed to maintain navigation in the river. In these circumstances we think they are entitled to a decree which will be effective in bringing that violation and the unwarranted part of the diversion to an end. But in keeping with the principles on which courts of equity condition their relief, and by way of avoiding any unnecessary hazard to the health of the people of that section, our decree should be so framed as to accord to the Sanitary District a reasonably practicable time within which to provide some other means of disposing of the sewage, reducing the diversion as the artificial disposition of the sewage increases from time to time, until it is entirely disposed of thereby, when there shall be a final, permanent operative and effective injunction. * * *

"The situation requires the District to devise proper methods for providing sufficient money and to construct and put in operation with all reasonable expedition adequate plants for the disposition of the sewage through other means than the Lake diversion.

"Though the restoration of just rights to the complainants will be gradual instead of immediate it must be continuous and as speedy as practicable, and *must include everything that is essential to an effective project.*

* * * * *

"To determine the practical measures needed to effect the object just stated and the period required for their completion there will be need for the examination of experts; and the appropriate provisions of the necessary decree will require careful consideration. For this reason, the case will be again referred to the Master for a further examination into the questions indicated."

By this order of Re-Reference there was, therefore, submitted to the Special Master for determination the following questions:

(1) What are the practical measures necessary for the disposition of the sewage of the Sanitary District of Chicago through other means than diversion;

(2) Within what time can these practical measures be completed and put into operation;

(3) What reductions in the diversion will be practicable immediately, and from time to time, pending the completion and placing in operation of the various practical measures necessary for the disposition of the sewage of the Sanitary District through other means than diversion;

(4) What diversion, if any, will be necessary for the purpose of maintaining navigation in the Chicago River, as part of the Port of Chicago, after such practical measures have been completed and placed in full operation?

After extended hearings on Re-Reference, the Master made and filed his report, (hereinafter called Master's Report in contra-distinction to Master's Original Report) answering the foregoing questions, as follows:

In answer to the FIRST QUESTION the Master found:

"That the completion of the North Side, West Side, Calumet, and Southwest Side Sewage Treatment works, above described, with their appurtenances and the necessary intercepting sewers, and the efficient operation of these plants, *will afford practical measures from the standpoint of present sanitary engineering knowledge for the complete treatment of the dry weather flow of sewage and wastes* of all the area comprised within the Sanitary District of Chicago, and also, in times of storm, of approximately 150% of the ordinary dry weather flow of sewage and wastes; that in the actual operation of these plants it may appear that a greater amount of the storm flow can be treated at least in part." (Master's Report, pp. 34, 35, 141.)

While not included in his answer to the FIRST QUESTION, the Master subsequently in his Report provided for

the construction of new controlling works at or near the Northern or Eastern terminus of the Drainage Canal, or in the Chicago River for the purpose of preventing restoration of the natural flow of that river into Lake Michigan, and concluded that the ultimate relief of the complainants should be dependent upon the discretion of the Secretary of War in authorizing the construction of such controlling works. (Master's Report, pp. 81, 142-3.) Complainants submit, as hereinafter more particularly pointed out, at pages 35 to 37 *infra*, that such controlling works are not an essential part of the program of practical measures for disposition of the sewage without diversion, and that the effect of this conclusion is to transfer the functions of this Court in the adjudication of these causes to the Secretary of War and leave to his discretion the determination of when, or whether at all, the rights which this Court adjudged in these complainants shall be secured to them.

In answering this question on Re-Reference, the Master further found that none of the following structures, measures or operations is an essential part of a program of practical measures for the disposition of the sewage of the Sanitary District without diversion.

(a) That it is not essential to require the Sanitary District to so construct and/or operate its sewage treatment works as to afford at least preliminary treatment of storm water overflows up to the capacity of the intercepting sewers. (4000 c.f.s.) (Master's Report, pp. 19-23.)

(b) That the construction of a separate system of sanitary sewers so as to prevent any sewage in dilution or otherwise being carried into the river or channels at times of storm water run-off or overflow, is not an essential part of a program of practical measures for the disposition of the sewage without diversion. (Master's Report, p. 24.)

(c) That water filtration or purification works for the domestic water supply of Chicago are not a necessary part of a program of practical measures for the purpose stated. (Master's Report, p. 25.)

(d) That any extension of the present water intakes is not an essential part of such a program. (Master's Report, p. 25.)

(e) That the construction of a new water intake off the North Shore at Chicago and remote (20 miles) from the mouth of the Chicago River is not an essential part of such a program. (Master's Report, p. 25.)

(f) That chlorination of the effluents of the sewage disposal works is not an essential part of such a practical program. (Master's Report, p. 25.)

(g) That the construction of outfall sewers from the sewage treatment works to selected points in Lake Michigan so as to divert the effluents wholly from the Chicago River and auxiliary channels is not an essential part of such a program. (Master's Report, pp. 133-134, 137.)

(h) That provision for the pumping of circulating water through the channels of the Chicago River to guard against the possibility of any interference with navigation in such channels is not a part of a program of practical measures for the purpose stated. (Master's Report, pp. 134, 135, 137, 138.)

It is thus apparent that the Special Master interpreted this question on Re-Reference as though it simply required him to find what sewage treatment works would be required to provide complete treatment of the sewage of the Sanitary District by artificial processes. On the other hand, complainants respectfully submit that the question submitted to the Special Master by this Court was not as just stated, but required the inclusion in the program of practical measures of every structure, plant or operation, whether it be for the artificial treatment of the sewage or otherwise, which might be necessary to effect the object

stated by the Court. In the words of the Court, this program "must include everything that is essential to an effective project." (278 U. S. 367 at 421.)

In answer to the SECOND QUESTION, the Special Master found that all of the sewage treatment works could be completed and placed in operation on or before December 31, 1938. (Master's Report, pp. 141, 142.) He also found that controlling works, if built, could be completed in a period of two years, (Master's Report, p. 81) and that water filtration works, if built, could be completed within a period of five calendar years (Master's Report, p. 82). The Master also found that complainants' witnesses estimated that it would take from five to eight years to construct a new super-tunnel or water intake 4½ miles off shore in the vicinity of Wilmette and approximately 20 miles from the mouth of the Chicago River.

In answer to the THIRD QUESTION, the Special Master found that the diversion could be reduced to an annual average of 6500 c.f.s. in addition to domestic pumpage on July 1, 1930, that if and when controlling works should have been constructed, pending the completion of the program, the diversion should be reduced to 5000 c.f.s. in addition to domestic pumpage and that whether any further reductions could be had in the diversion pending the completion of the practical measures for the disposal of the sewage without diversion should await an examination of results from time to time as the work of sewage treatment progresses. (Master's Report, pp. 142-3, 104-5, 118-9.)

In answer to the FOURTH QUESTION, submitted by the Court on Re-Reference, the Master concluded as a matter of law that the Sanitary District was entitled to divert the domestic pumpage of the City of Chicago and that the interests of navigation in the Chicago River as a part of the Port of Chicago will, therefore, require the diversion of not less than 1000 c.f.s. and not more than

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COMPLAINANTS' EXCEPTIONS.

Complainants take no exceptions to the findings and conclusions of the Special Master in answer to the SECOND and THIRD QUESTIONS submitted by the court, which questions and answers have hereinbefore been specifically stated and relate respectively to the determination of the time required for the completion and placing in operation of the practical measures described by the Master and the determination of the reductions in the diversion which may be had immediately and from time to time during the carrying out of the program. Complainants do except to the findings and conclusions of the Special Master in answer to the FIRST and FOURTH QUESTIONS submitted by the Court. While it was deemed necessary to take a number of ancillary exceptions to statements contained in the report of the Special Master, the primary and fundamental exceptions of the complainants, to which all other exceptions are ancillary and subordinate, are as follows:

1. That the program of practical measures for the disposition of the sewage of the District without diversion outlined by the Special Master in answer to the first question submitted by this Court (measured by the relief which the Master found could be predicated upon it) does not constitute a complete program for the disposition of the sewage of the District without diversion and is not in compliance with or responsive to the order of Re-Reference in this case. (Complainants' Exceptions I and I-A to I-G incl.)

2. That the Master erred in concluding that controlling works are an essential part of a program of practical measures for the disposition of the sewage of the District without diversion and that the construction of such controlling works in the Drainage Canal is subject to the discretion of the Secretary of War under the Act of March 3, 1899; and that he erred in thereby transferring from this Court to the Secretary of War the adjudication of this case and the determination of when or whether at all complainants should have the relief awarded by the decision of this court under date of January 14, 1929. (Complainants' Exceptions I-E, II, II-A.)

3. That the Special Master erred in not concluding in answer to the FOURTH QUESTION submitted by the court that upon the completion of the program of practical measures outlined by him (less control works) or of that program (less control works) supplemented by other available practical measures, no diversion or flow at Lockport is necessary or legally admissible, without the consent of the complainants, for the purpose of maintaining navigation in the Chicago River as part of the Port of Chicago or for any other purpose. (Complainants' Exceptions II and II-A to II-N, incl.)

4. That the Special Master should have recommended that the costs, including the fees of the Special Master as fixed by this Court, should be taxed against the defendants. (Complainants' Exception III.)

DEFENDANTS' EXCEPTIONS.

Defendants' Exceptions Nos. 1 and 2 challenge every finding and conclusion in the Report of the Special Master and every provision in his recommended decree with the exception of the description of the sewage treatment works proposed by the defendants. We are informally advised that the defendants do not intend their exceptions to go so far but intend their general Exceptions Nos. 1 and 2 to be limited by their subsequent Exceptions Nos. 3 to 13 in-

clusive. Measured in that way, the Exceptions of the defendants are:

1. That the Master erred in not allowing a longer period of time for constructing and placing in operation the practical measures outlined by him for the disposition of the sewage of the Sanitary District without diversion. (Defendants' Exceptions, Nos. 3, 4, 5 and 6.)

2. That the Master erred in holding that this Court has jurisdiction to determine the amount of diversion, if any, which will be legally admissible during the construction and after the completion of the program of practical measures for the disposition of the sewage of the District without diversion on the ground that such action constitutes an invasion by the Judicial Branch of the jurisdiction of the Legislative and Administrative Branches of the Federal Government. (Defendants' Exceptions Nos. 7, 8 and 9.)

3. That the Master erred in not allowing an additional diversion in the alleged interests of navigation on the Illinois River and the Illinois-Michigan Canal. (Defendants' Exceptions Nos. 10, 11.)

4. That the Master erred in not finding that a diversion of at least 2000 second feet in addition to domestic pumpage would be necessary after the completion of the program of practical measures outlined by him in the interests of navigation in the Chicago River as part of the Port of Chicago. (Defendants' Exception No. 12.)

5. That the Master erred in refusing to find that it is impracticable at this time to determine the permissible reductions in the diversion at various times during the construction period of the program and to determine whether any diversion will be necessary at the end of said period in the interests of navigation and in refusing to find that the determination of these questions should be made by the Secretary of War upon the recommendation of the Chief of Engineers. (Defendants' Exception No. 13.)

ISSUES.

The issues thus raised upon the exceptions to the Report of the Special Master filed by the respective parties are:

1. Whether the program of practical measures for the disposition of the sewage of the District without diversion outlined by the Special Master in answer to the first question submitted by this Court (measured by the relief which the Master found could be predicated upon it) constitutes a complete program for the disposition of the sewage of the District without diversion and is responsive to or in compliance with the order of Re-Reference in this case.

2. Whether control works are an essential part of a program of practical measures for the disposition of the sewage of the District without diversion, and if so, whether their construction in the Drainage Canal is subject to the discretion of the Secretary of War so as to delegate to him the determination of whether the rights of the complainants shall be restored to them.

3. Whether any diversion or flow at Lockport is necessary or legally admissible for the purpose of maintaining navigation in the Chicago River as part of the Port of Chicago, or for any other purpose, upon the completion of the program of practical measures outlined by the Special Master (less control works) or of that program (less control works) supplemented by other available practical measures.

4. Whether the Master erred in failing to recommend that the costs, including the fees of the Special Master as fixed by this Court, should be taxed against the defendants.

5. Whether the Master should have allowed a longer period of time for the construction and placing in operation of the practical measures described by him.

6. Whether this Court has jurisdiction to determine the extent of diversion, if any, which will be legally

admissible during and after the completion of the construction of the program of practical measures.

7. Whether the Master erred in not allowing an additional diversion in the alleged interests of navigation in the Illinois River and Illinois and Michigan Canal.

8. Whether the Master erred in not holding that a diversion of at least 2000 c.f.s. in addition to domestic pumpage will be necessary after the completion of the program described by him in the interests of navigation in the Chicago River as part of the Port of Chicago.

9. Whether the Master erred in failing to find and conclude that it is impracticable at this time to determine the permissible reductions in the diversion during the construction period or on the completion of the program and that such reduction should be determined by the Secretary of War upon the recommendation of the Chief of Engineers.

Additional Issues which must be determined before a Decree can be entered in these causes allowing any diversion or flow at Lockport subsequent to the completion of the program of practical measures for the disposition of the sewage without diversion.

Complainants believe that on a consideration of the exceptions filed by them a judgment terminating all flow at Lockport after the completion of the program should be entered without regard to the fundamental constitutional questions which complainants have urged throughout this litigation. However, if the Court should conclude that, apart from the constitutional questions hereinafter mentioned, a judgment terminating all flow at Lockport should not be entered upon the consideration of the exceptions to the Master's Report, then the fundamental constitutional questions challenging the power of the Federal Government to authorize any diversion from the Great

Lakes-St. Lawrence Watershed to the Mississippi Watershed under the circumstances of this case must be determined; for unless such questions are all determined adversely to these complainants, no judgment permitting the continuation of any flow at Lockport after completion of the program can have a legal basis. This Court in its opinion of January 14, 1929, after adverting to the defendants' claim that the diversion was authorized by Congressional action in the regulation of Interstate Commerce, said in 278 U. S. 367, at 410:

> "Those States reply that the regulation of interstate commerce under the Constitution does not authorize the transfer by Congress of any of the navigable capacity of the Great Lakes System of Waters to the Mississippi basin, that is from one great watershed to another; second, that the transfer is contrary to the provision of the Constitution forbidding the preference of the ports of one State over those of another and, third, that the injuries to the complainant States deprive them and their citizens and property owners of property without due process of law and of the natural advantages of their position, contrary to their sovereign rights as members of the Union. If one of these issues is decided in favor of the complaining States, it ends the case in their favor and the diversion must be enjoined. But in the view which we take respecting what actually has been done by Congress some of these objections need not be considered or passed upon."

The complainants believe that, under the findings and evidence in this case, apart from the foregoing constitutional objections, neither the recommended decree nor any other decree purporting to authorize or permit a continuation of diversion after the completion of the practical program may be lawfully entered; but if a different conclusion were reached in that respect, then every one of these constitutional questions which were laid to one side

by this Court in its previous decision must be decided and determined. These questions are all argued fully in the briefs filed by the complainants at the hearing on the exceptions to the Master's Report on the Original Reference. It is, therefore, deemed unnecessary to reiterate those arguments, but if the Court in the consideration of these causes reaches a point where it is necessary to determine those questions, then complainants refer to their briefs so filed for the argument in support of complainants' views.

If a decree were entered as recommended by the Special Master, it would result in a permanent diversion amounting under present conditions to approximately 3200 second feet (about 1700 c.f.s. domestic pumpage and 1500 c.f.s. additional abstraction), and subject to an indefinite increase, limited only by defendants' moderation in pumping water which could be advantageously used for sanitation and water power on the other side of the Continental Divide. Measured by present conditions, this would result in a permanent lowering of the Lakes substantially in excess of two inches. The only difference between such a situation and the one found to exist by the Special Master on his Original Report would be that the vast, widespread and annually recurring damages of the Complainants, which were described in the Master's Original Report and in the decision of this Court, would be reduced to something in excess of 37% of the damages so found, with a constant increase as Chicago pumped more water. The vast and annually recurring damages of the complainant States, which would then remain, could not by any fair process of reasoning be said to be insubstantial or within the rule of *de minimis non curat lex.* The rights of the complainant states and their peoples in the interests involved in these cases should not be defeated by a decree which would merely result in the lowering of the Lake levels in excess of two inches instead of six inches.

ARGUMENT.

I.

THE PROGRAM OUTLINED BY THE MASTER, (MEASURED BY THE MASTER'S INTERPRETATION OF THE RELIEF WHICH MAY BE PREDICATED UPON IT), DOES NOT CONSTITUTE A COMPLETE OR ADEQUATE PROGRAM OF PRACTICAL MEASURES FOR THE DISPOSITION OF THE SEWAGE OF THE SANITARY DISTRICT THROUGH OTHER MEANS THAN LAKE DIVERSION AND, AS INTERPRETED BY THE MASTER, IS NOT RESPONSIVE TO OR IN COMPLIANCE WITH THE ORDER OF RE-REFERENCE OF THIS COURT DATED JANUARY 14, 1929.

A.

The scope of the FIRST QUESTION submitted by the Court.

This discussion here deals with the answer to the FIRST QUESTION submitted to the Master on Re-Reference, to-wit:

> "What are the practical measures necessary for the disposition of the sewage of the Sanitary District of Chicago through other means than diversion?"

From the opinion of the court, it is clear that the purpose of this question on Re-Reference was twofold:

> 1st. To determine what practical measures were required so to dispose of the sewage that no nuisance or interference with navigation would be created, and so that thereafter no diversion should be necessary to protect navigation in the Chicago River against injury from the sewage or from the method of sewage disposal adopted by the Sanitary District.
>
> 2d. To determine what practical measures were necessary for the protection of the public health with the termination of the diversion, not because any diver-

sion could be maintained in the interests of sanitation, which was expressly denied, but to the end that the court might give the defendants a reasonable period of time for the construction of any needed measures in the interests of public health so as not to create "any unnecessary hazard to the health of the people of that section."

It is clear that this Court expected "the Sanitary District to take care of its sewage in some other way than by promoting or continuing the existing diversion"; that the sewage of the District should be "entirely disposed of thereby"; and that the method so adopted "*must include everything that is essential to an effective project.*" (278 U. S. 367, 418, 419, 421.) It was "to determine the practical measures to effect the object just stated" that this question was referred to the Special Master. (278 U. S. 367, 421.)

Obviously the practical measures so necessary could not be determined without a consideration of the relation of their operation to the object the Court stated should be accomplished. This clearly meant that in the selection of such measures, both as to their nature and quantity, the rule of determination must be that the program must include the kind and number of measures which, without diversion, would not in their operation produce any interference with navigation. We think it also fairly appears that the Court intended that the program should include any measures necessary to protect the public health in the absence of diversion so that the Court could give a reasonable time for their construction to prevent "any unnecessary hazard to the health of the people of that region."

In short, the mandate of the Court required the inclusion, in the program of practical measures, of every structure, plant and operation, whether it be for the artificial treatment of the sewage or otherwise, which might be necessary to effect the object stated by the Court.

B.

The practical measures established by the evidence as available to accomplish the purposes stated by the court, their operation and effect, and the extent to which such practical measures were included in the Master's program.

With this analysis of the FIRST QUESTION submitted by the Court on Re-Reference, we proceed to inquire whether the answer of the Special Master is responsive thereto. The sufficiency of the Master's findings in that respect must be tested by the extent to which the Master finds his recommended program will effect the object of the Court as hereinbefore stated. For that purpose we proceed to compare the program of practical measures recommended by the Special Master with the program advanced by the defendants, the program advanced by the complainants and the additional practical measures proved to be available for inclusion in such a program if deemed essential to effect the object which the Court held should be accomplished.

1.

PROGRAM RECOMMENDED BY SPECIAL MASTER.

The Master recommended the construction and operation of sewage treatment works and the installation of control works. (Master's Report 141-3, 146-7.) The Master made the construction of control works dependent upon the discretion of the Secretary of War (Master's Report 81, 142-3), and thereby made complainants' relief beyond the preliminary reduction of 2000 second feet dependent upon the discretion of the Secretary of War. (Master's Report 143.) Assuming the Secretary of War authorized control works, the Master's program in his opinion would only reduce the diversion to an amount equivalent to the domestic

pumpage plus 1500 c.f.s. additional water from the Great Lakes-St. Lawrence Watershed. (Master's Report 143.) While complainants believe that the Master erred in his conclusion as to the relief which could be predicated upon his program, its sufficiency is here being tested by the Master's determination in that respect.

2.

PROGRAM OF THE DEFENDANTS.

In answer to the mandate of this Court, the defendants proposed the construction of sewage treatment works, control works, diversion of the domestic pumpage, diversion of the run-off of the Chicago and Calumet Rivers naturally tributary to Lake Michigan, and the diversion of 2000 second feet additional water from Lake Michigan. Complainants submit that this program of the defendants not only wholly fails to comply with the mandate of the court, but is directly in the teeth of the decision of January 14, 1929.

Defendants' principal witness, Pearse, admitted that there was a program which would not require any flow at Lockport, but stated that he had not given such a program so much consideration. (Joint Abstract 70-71.) Pearse stated that it would be "rather hard to choose" between such a program and the one advanced by the District from a public health standpoint. (Joint Abstract 514-5.)

3.

PROGRAM OF THE COMPLAINANTS.

The complainants propose the construction of the sewage treatment works, the construction of water purification works, no controlling works unless defendants desire them as a factor of safety, and no diversion or flow at Lockport after the completion of the program. (Master's Report,

18-25; Joint Abstract, Howson 106; Gascoigne 207; D. Townsend 213-4.)

All of complainants' witnesses testified that this program would be adequate to maintain navigation in the Chicago River as a part of the Port of Chicago without interference from nuisance or otherwise, and with no flow at Lockport, and would likewise provide public health conditions equal or superior to those now obtaining in Chicago. (Joint Abstract, 107-110; 208-210; 214-216.)

However, complainants pointed out that this program by no means exhausted the available practical measures either for the prevention of nuisance to or interference with navigation, or for the protection of the public health. The nature and operation of these additional practical measures were shown. The complainants took the position that since such additional practical measures were in the nature of improvements not essential to accomplish the purpose stated by the Court, complainants would not urge their inclusion in the program in the event that the Court accepted complainants' view that they were not essential to the restoration of complainants' rights; but complainants at all times insisted that if in the opinion of the Master or Court any or all of such additional measures were essential to the restoration of the complainants' rights, then such measures must, to that extent, be included in the mandatory program to be imposed upon the defendants.

4.

ADDITIONAL PRACTICAL MEASURES AVAILABLE FOR INCORPORATION IN THE PROGRAM IF DEEMED ESSENTIAL TO ACCOMPLISH THE PURPOSE STATED BY THE COURT AND TO RESTORE COMPLAINANTS' RIGHTS.

The precise relation of such additional practical measures to the relief essential to a restoration of complainants' rights will be discussed in the following section of this brief. At this point complainants will simply point out the nature of such additional practical measures and the method and purpose of their operation.

a.

Additional practical measures available to safeguard conditions of navigation in the Chicago River.

(1)

That the District be required to so construct and/or operate its sewage treatment works as to afford at least preliminary treatment of storm water overflows up to the capacity of the intercepting sewers.

Defendants propose to treat only 150% of the dry weather flow at times of storm water run-off. (Master's Report, 14, 15.) While complainants deem treatment to this extent adequate with no diversion or flow at Lockport, defendants seek to preserve their diversion upon the ground that the excess of storm water run-off will carry some sewage, although in a high state of dilution. (Joint Abstract, 228-9.) The Court is, of course, familiar with the fact that the main sewers of the City of Chicago discharge into large intercepting sewers which convey the sewage to the respective treatment works. When a sufficient quantity of rainfall enters the sewers to produce a flow greater than the capacity of these intercepting sewers, the surplus is by-passed, through outlets provided for that

purpose, into the Chicago River, its branches and the auxiliary channels of the Sanitary District.

The capacity of the intercepting sewers is 4,000 c.f.s. (Joint Abstract 113-114.) The volume of the sewage flow at Chicago under present conditions is approximately 1500 c.f.s. (Joint Abstract 87.) If Chicago meters its domestic water supply as it was required to do under the Permit of March 3, 1925, but has not done, the domestic pumpage and the corresponding sewage flow will only be 1000 c.f.s. in 1935. (Joint Abstract 111.) As pointed out by the Special Master, the sewage treatment works consist of Imhoff tanks which remove a large part of the settleable solids and other impurities, followed by activated sludge or trickling filter treatment which provide complete treatment. (Master's Report 12.) While it seems clear that, at least with metering, the plants as proposed by the Sanitary District can give complete treatment very largely in excess of 150% of the dry weather flow, it is perfectly clear that the preliminary or tank treatment can be given to all of the storm flow up to the capacity of the intercepting sewers or 4000 c.f.s. (Joint Abstract, Howson 113-4; Gascoigne 648-9; Master's Report, Howson 20; Gascoigne 21; D. Townsend 22.) This will mean at least preliminary treatment for 267% of the dry weather flow at times of storm run-off of that amount even under present conditions and with metering will afford at least preliminary treatment for 400% of the dry weather flow at times of storm water run-off equaling or exceeding that extent. While complainants deem this to be wholly unessential, it is perfectly practical and its omission can not be made the ground of any diminution of the complainants' rights. The relation of this provision to termination of the diversion will be discussed in an appropriate section.

(2)

The construction of a separate system of sanitary sewers.

The Court is, of course, familiar with the fact that where a city has a separate system of sanitary sewers, no storm water run-off passes into the system of sanitary sewers, but such run-off is carried away by the storm water sewers instead of mingling with the sewage as in the case of a combined sewer system. Complainants consider the construction of such a system wholly unnecessary to permit a termination of all flow at Lockport either from the standpoint of public health or navigation. However, such a system can be constructed in Chicago if it be deemed necessary. We do not understand that that fact is denied by the defendants, who have offered several estimates of the cost of such a system. (Master's Report 24; Joint Abstract 638-9, 519, 529, 572, 798, 800, 453.)

If it were constructed, there would be no sewage, untreated or otherwise, carried into the Chicago River or its branches by storm water run-off; but all of the sewage of the Sanitary District would be given complete treatment, as that term is understood, at times of storm water run-off as well as at times of dry weather flow. This would remove all of the alleged likelihood of some portion of the sewage being carried by the storm water, though highly diluted, into the River at such times. All debate as to the effect of storm water run-off would be thereby removed. The Special Master states that the complainants have not incorporated such a sewer system in their program. That is true for the reason that complainants do not deem it essential to accomplish the purposes stated. However, complainants have never conceded that the construction of such a system could be omitted, if it were deemed a condition of the restoration of their rights, but on the contrary insist that under such circumstances it must be incorpo-

rated in this program. An infringement of complainants' rights can not be substituted for this measure. We do not believe that defendants think that such a system would be necessary from the standpoint of navigation or public health with complete cessation of all flow at Lockport, but it is advanced in line with the consistent policy of the Sanitary District for at least 20 years to take the position that they are confronted with a situation with which they are unable to cope.

The Master states that defendants' witness, Matthews, estimated the cost of such a system at over $400,000,000. (Master's Report 24.) Of course, the Master does not find that such a figure would be a reasonable cost. It is clear from Mr. Matthews' own testimony that it would be grossly excessive. The present mileage of the combined sewer system in Chicago is less than 3200 miles. (Joint Abstract 378.) This witness based his estimate upon a mileage of 5300 miles. (Joint Abstract 378.) Matthews stated that a large part of his plan of the separate sewer system is to get the sewage to the sewage treatment plants. (Joint Abstract* 376.) That is a clear duplication since the Sanitary District has separately included exorbitant estimates of costs of sewers for such purposes in its program. (Master's Report 10-11, 72-80.) He provided a sewer system on the basis of residential requirements on the total area of Chicago without any deduction for the large industrial areas, the areas occupied by railroads, the areas occupied by parks, or the 25 square miles in Chicago which are not built up or sewered. He provided sewers for the area covered by Lake Calumet. (J. A. 378-80.) If any other water areas are included in the computation of area of the City Map Department, sewers are also provided for them.

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*Hereafter references to the Joint Abstract of Record for hearing upon exceptions to the Special Master's Report on Re-Reference, filed February 20, 1930, are indicated by use of the abbreviation "J. A."

(J. A. 380.) The Sanitary system proposed was for domestic pumpage around 1500 second feet. The capacity of the present combined system is about 13,000 second feet. Of course, sanitary sewers are very small compared to combined sewers for storm water purposes. The total cost of the present combined system which carries the sanitary sewage and all of the storm water overflows up to a capacity of 13,000 second feet is less than $60,000,000 as shown by the records of the Department of Public Works. This should be compared with witness' estimate of over $400,000,000 for a sanitary system carrying only 1500 c.f.s. Catch basins are not required on the sanitary system except in buildings. (J. A. 380-1.) The witness was unwilling to state that the City of Chicago had not received bids for the construction of 8" sewers, at $1.18 per foot in comparison with his estimate of $4.14 per foot. (J. A. 382-3.) It seems clear that the witness' estimate in all of these respects is grossly excessive.

Complainants' witness, Howson, on Original Reference estimated the cost of a separate system of sewers to be from $158,000,000 to $171,000,000. (J. A. 639, 644-646.) The defendants' witness, Pearse, estimated the cost of such a system at $250,000,000. (J. A. 519, 529.) Defendants' witness, Fuller, testified on Original Reference that a separate system *might* cost $300,000,000, and thought such a sum would not be extravagant to spend for such a purpose. (J. A. 572.)

(3)

Construction of Outfall Sewers from the Sewage Treatment Works.

Again the complainants' witnesses have pointed out that it is perfectly practicable to construct outfall sewers from the various sewage treatment works so as to discharge the effluent of those plants at remote points in Lake Michi-

gan and remove such effluents wholly from the channels of the Chicago River and its branches. This was stated to be perfectly practical by complainants' witnesses. (J. A., Gascoigne 210; Townsend 216-7; Howson 109.) The practicability of so doing was not denied by any witness for the defendants. The Special Master stresses that Mr. Howson testified that he could physically construct such outfall sewers but that he did not mean that it was practical in the sense that he would recommend doing it as an available means for the City in disposing of the sewage at this time. (Master's Report 134.) Of course, Mr. Howson did not recommend it, and did not incorporate it in his program. That, however, as clearly appears from the testimony of all of complainants' witnesses, was merely because in his opinion there was no necessity for removing the effluents of these works from the River, either in the interests of navigation or public health. Naturally, Mr. Howson would not, therefore, recommend the performance of work which he considered wholly unnecessary. However, Mr. Howson did not mean that if there were any reason for removing the effluent from the River to protect navigation or otherwise, it would not be practicable to do so in the way outlined. It would only involve the construction of a few miles of sewers. The position of the complainants is that such a course is unnecessary but if the court feels that the presence of the effluent in the River without diversion would constitute any interference with navigation or give rise to any necessity for diversion, then it is practical to construct such outfall sewers and the defendants should be required to do so.

(4)

Pumping of Circulating Water.

While complainants submit that it will be unnecessary to pump circulating water, on completion of these sewage treatment works and no flow at Lockport, to prevent any interference with navigation in the Port of Chicago, there is no question but that such a procedure is practical and that the defendants should be required to provide such circulating water if any necessity therefor should develop. (J. A., Howson 109-110; Gascoigne 210; D. Townsend 216; Ramey 87; Jadwin 19, 27-29.) By this process 1000 c. f. s. of lake water may be pumped into the head of the North Channel through the existing Willmette Pumping Station; 2000 c. f. s. of lake water into the South Branch of the Chicago River through the existing Pumping Station at 39th Street, and 2000 c. f. s. of lake water through the Calumet-Sag Channel. This water will then flow through these Channels and out through the Main Channel of the Chicago River into the Lake. (Master's Report 135; J. A. 109, 110; 210; 216; 19, 27-29, 87.) This would not only prevent any possibility of interference with navigation, but would restore a thriving fish life, which has been absent from these waters for many years and which is not essential to protect navigation. (J. A., Jadwin 29; Howson 110.) It is a complete answer to any claim that there could be any nuisance to navigation in the Chicago River as a result of the presence of effluent or storm water overflow. If a certain quantity of water will protect navigation flowing westward through the Chicago River, it is axiomatic that the same quantity of water flowing in the opposite direction will equally protect navigation in that River. The same may be said of storm water overflow.

The Master, in his Report at page 138, states that it would create a danger of contaminating the water supply and have a possible adverse effect on bathing beaches. Ini-

tially complainants submit that no diversion can be justified in the interests of sanitation after the completion of the program under the terms of the Court's decree and that this observation of the Special Master is in contravention of the decision of the Court. However, we invite the Court's attention to the fact that the Master has refused to include water filtration works, chlorination of effluents, extension of water intakes, construction of a new water intake or a separate system of sanitary sewers as part of his practical program. All of these measures would guard against any possible injury to the water supply or the public health. All of them would not be needed. Water filtration works alone would do so. Yet, after omitting all such provisions from his program, the Special Master bases, in part at least, a denial of complainants' rights upon an alleged danger to public health, created, (if it exists at all) by reason of the failure to include some one or more of these measures in the program. We submit that complainants' rights should not be thus defeated.

b.

Additional practical measures available in the interest of public health.

(1)

Water Filtration Works.

The program proposed by the complainants provides for the installation of water purification works for all of the domestic water supply of the city of Chicago. (Master's Report 20, 24-5; J. A. 207, 214, 226-7, 238-9.) As far as the complainants and the court are concerned, it is wholly unnecessary to provide any measures in the interests of the public health, because the court has expressly held that any diversion for sanitary purposes is inadmissible because resting upon no legal basis. Undoubtedly it is also true that with the completion and operation of the plants for what is

known as complete treatment of all of the sewage of the Sanitary District of Chicago, chlorination of the water supply, as now practiced, could be made a sufficient barrier. (Ellms, J. A. 627.) Certainly, however, it is true that the installation of water purification works with complete sewage treatment and no flow at Lockport would adequately safeguard the public water supply. (Joint Abstract, Howson 108, 639; Gascoigne 208-9; Townsend, D., 214-15; Ellms 226-7, 236-7; 620; Waring 238-9, 613; Rockwood 591-2.) For that reason, the complainants have incorporated in their program a provision for filtration of all of the domestic water supply of Chicago.

Even the defendants' witness Pearse admits that it would be very difficult for him to choose, from the public health standpoint, between the conditions which would obtain with the completion of sewage purification works and water filtration works with no diversion and the conditions which would obtain with the completion of sewage purification works and a continuance of the present diversion. (J. A. 514-15.) Pearse stated at the last hearings that if the sewage effluent were returned to the Lake, such effluent should be chlorinated if the water supply were chlorinated only, and that if the storm water overflows are also discharged into the Lake at all times, then water filtration plants should be provided "in order to make the result as a whole of the same degree of effectiveness to the community as we have attained or *contemplate,* as regards sewage treatment and the protection of the water supply." (J. A. 70.)

Although any claim of a diversion in the interest of public health subsequent to the completion of the program is no longer open under the decision of this Court, the claims of the defendants in this respect on the original hearings were based upon answers to the following artfully framed question:

"Q. Now, assuming that these works (works similar to those in complainants' program) were installed and the diversion were reduced to zero or 1000 c.f.s. from a public health standpoint would the condition be as good as it would be with the program of the Sanitary District carried out with reference to sewage disposal and with a diversion of 8500 c.f.s. or substantially that?" (Record 5047-8.) (Abstracted J. A. 70.)

This identical question was asked of all of the defendants' sanitary experts. It is very significant that this question did not ask the witnesses to state whether under the assumed condition, the public health conditions would be safe or satisfactory, or whether they would be as good as presently obtain. This question was answered by defendants' witnesses upon the theory of the Sanitary District that under their program all of the sewage would be completely purified, and that in addition thereto, there would be a continuous flow through the Sanitary Canal sufficient to divert all of the waters of the Chicago basin from the Lake both at times of storm and otherwise. This was equivalent to asking a witness whether it would be preferable for a city to have no sewage disposal and water supply problem at all, or to solve such problem in a scientific and satisfactory way. This begged the whole question. The purpose of so artfully framing this question is apparent. Even then defendants' witness Pearse found it "rather hard to choose" between the two situations.

While the complainants were under no legal obligation to propose a program in the interests of the public health of Chicago, they felt that a practical program should make such an obvious provision for the protection of the public health; and they, therefore, included such a provision in their program. If the defendants prefer to waive that provision in the interests of public health, the complainants have no objection; but neither the defendants nor the

Master should make a waiver of this obvious and adequate provision for the protection of the public health the basis of any demand for an infringement of the legal rights of the complainants through a diversion of some quantity of water from the Great Lakes-St. Lawrence Waterway in the interests of public health. Such a course would not only be grossly inequitable as a continuation of the illegal procedure of providing for the sanitation of Chicago at the expense of the complainant States, but it would be directly in the teeth of the decision of January 14, 1929, wherein it was expressly held that any diversion in the interests of sanitation at Chicago had no legal basis and was unsupportable.

The Master apparently omits water filtration works from his program on the ground that they are not structures for the treatment of sewage. (Master's Report 25.) He apparently bases their elimination upon the ground that the complainants have stated that such works are not an indispensable element in the program and therefore should be left to the discretion of the defendants. The Master thus follows the method adopted throughout his report of eliminating every practical measure which the complainants deem not essential to their relief and then denying the complainants relief because of the elimination of such measures. The position of the complainants was stated before the Special Master in exactly the same way and practically the same language as here stated. There was, therefore, no ground for a conclusion that complainants stated that this and other practical measures should not be included in the program if the omission of any such measures were to be made the ground of a denial of their rights.

The Master does in effect find that if diversion at Lockport is not continued, water purification works should

be constructed. (Master's Report 81.) The Master does find that they are practical and could be completed in a period of about five calendar years. (Master's Report 82.)

(2)

The construction of a new water intake or the extension of the present water intake.

Complainants' experts did not regard it as open to debate but that the present water intakes, with sewage treatment, no flow at Lockport and the installation of water filtration works would provide a water supply equal or superior to that presently obtaining at Chicago and which defendants have consistently claimed to be of superior quality. (See pp. 28 to 39 *supra* and citations to Joint Abstract there given.) However, complainants pointed out that if any doubt were entertained on that point, two courses were practical:

1st—the present water intakes might be extended farther into the Lake as it is universally admitted that with or without diversion the distance from the shore is an important factor in the purity of the raw water at the intakes. (Joint Abstract Howson, 106-7, 637; Gascoigne 208; Ellms 227; Waring 239; Rockwood 592; Fuller 553, 555; Ex. 18, Par. 42, pp. 222-3, Appendix p. 105.)*

2d—both complainants' and defendants' witnesses pointed out that it would be practical to construct a new water intake remote from the mouth of the Chicago River. The point suggested by witnesses for both sides was about 4½ miles off shore at a point approximately 20 miles north of the mouth of the Chicago River. (Joint Abstract Howson 106-7, 637, 638; Gascoigne 208, 649; Ellms 227, 620; Fuller 553-4; Waring 239; Pearse 527.)

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*Pursuant to agreement of counsel, set forth in the foreword to the Joint Abstract, certain small items of evidence inadvertently omitted from the Joint Abstract are set forth in an Appendix to this brief for the convenience of the Court.

Complainants' witnesses were of the opinion that with an intake in such a location and no flow at Lockport the public water supply, without any water filtration works, would be as good or better than now obtained and that with water filtration works the water supply would be superior to that now obtaining. (Joint Abstract, Howson 639-40; Gascoigne 649; Ellms 620, 21; Waring 613; Rockwood 591.) We reiterate that objections to the complainants' program urged by the defendants are for the purpose of trying to induce a belief that there is no practical solution for the problem, to the end that their diversion may be continued. We do not think that with no diversion the defendants would construct such an intake, and complainants' witnesses consider it wholly unnecessary; but it is perfectly practical to do so. If the defendants choose to interpose captious objections to the program which has been proposed then they should be required to include one or the other of these measures in the program.

(3)

Chlorination of the effluent of the sewage disposal works.

Witnesses for both parties testified that it is perfectly practical to chlorinate the effluent of the sewage disposal works and that such chlorination will remove practically 100% of the bacteria. (Joint Abstract, Howson 637; Gascoigne 208; Ellms 627; Fuller 560; Rockwood 593; Pearse 514; Waring 615-6. Master's Report 28.)

Again, it is not considered necessary; but it is an obligation which the defendants should be required to assume if they choose to insist upon fanciful objections to the program.

(4)

The practical measures in the interests of navigation which likewise safeguard public health.

The practical measures in the interests of navigation with reference to treatment of additional quantities of storm water overflow or the construction of a separate system of sanitary sewers likewise constitute additional safeguards in the interests of public health. Since they have been discussed in relation to navigation, no further reference will be made to them here.

C.

The Master's recommended program (measured by the relief which he holds, can be predicated upon it), is not responsive to the order of Re-Reference.

The Special Master excluded all of the foregoing practical measures in the interests of navigation and/or public health from his recommended program. Because of the omission of these practical measures from his program the Master then proceeds to conclude that some diversion, in abridgment of the complainants' rights, is necessary in the interests of navigation in the Chicago River because of the possibility of a nuisance being created by the defendants. Notwithstanding the holding of this Court that public sanitation could not be made the basis of any diversion subsequent to the completion of the program contemplated by the Court, the Master seems to base his conclusion that some diversion is necessary, after the completion, in part on considerations of public sanitation. (Master's Report 138.) He thereby makes his omission of the practical measures which would clearly safeguard the public health a partial ground of denial of complainants' rights.

We submit that under the Order of Re-Reference the Special Master should not thus exclude certain practical

measures from the program recommended by him and then make his failure to include such practical measures and their omission from his program the basis of a conclusion that some diversion would be necessary upon its completion in the interests of navigation or otherwise.

Complainants reiterate that the program proposed by them is fully adequate to accomplish the purpose stated by this Court and the termination of diversion without addition of further practical measures. They are confident that if a decree is entered shutting off all flow at Lockport the defendants will provide just the practical measures outlined by the complainants as their program, and nothing more. However, these further measures are practical and available to defendants, if their professed dissatisfaction and fear were well founded. The defendants have raised specious and impractical objections to every proposal which would result in the termination of their diversion. If they wish to raise such objections, then they must assume the burden of meeting them at their own expense rather than at the expense of the complainants.

D.

Controlling works are not an essential part of the program.

The only function of controlling works is to prevent the flow of the Chicago River into the Lake, and thus preserve the diversion. They were originally suggested as a means of preventing the reversal of the Chicago River in times of storm water run-off with small diversion, for the protection of the water supply, in the absence of treatment for all the sewage, water purification works, extension or re-location of water intakes. As before stated, with complete sewage treatment, complainants hold that such reversals will not endanger the water supply, even without water filtration works. With water filtration works, or the

extension or re-location of water intakes, there could be no reasonable apprehension of danger to the water supply. If objections are to be pressed further, then the answer is that the defendants must construct a separate system of sanitary sewers.

General Jadwin testified that control works are not necessary in the interests of navigation; that there is no reason to fear that occasional storm discharge of untreated sewage into the Lake will render conditions there intolerable for navigation; and that the question of control works is therefore a sanitary matter for solution by the defendants (Master's Report 108, 109.) The inclusion of control works in the Master's program would be, therefore, but a harmless error so far as the complainants are concerned, if the Master did not make their inclusion in his program the basis of a denial of the relief awarded the complainants by this Court, and a remission of the protection of their rights to the discretion of the Secretary of War, substantially as he had held in his original report. (Master's Report 81, 142-3.)

The Master has stated both that "the complainants' sanitary experts have not testified that these controlling works would not be needed" and that complainants' experts "have not been ready to testify as to the feasibility of further reduction of the diversion without their installation, pending completion of the program." Every one of complainants' sanitary experts have testified that with completion of the complainants' program, and no flow at Lockport, (under which circumstances controlling works would not be operated and would be useless), conditions would be satisfactory both from the standpoint of navigation in the Chicago River and from the standpoint of public health. (Joint Abstract, Howson 106, 108; Gascoigne 207, 209; Townsend, D., 214, 215; Ellms 227, 228, 236-7; Waring 239;

Rockwood 591.) It is difficult to conceive how complainants' witnesses, unless it be by a categorical denial, could more definitely and clearly testify that controlling works are non-essential.

The defendants had proposed controlling works. Under the program proposed by complainants' witnesses such controlling works could serve no useful purpose except during the period of construction of practical measures, when only a part of the sewage would be receiving treatment, and the water filtration works would not yet be in operation. During that period it was considered important to prevent substantial reversals of the Chicago River. The operation of such control works during the construction period removed all debate as to the interim reductions in the diversion which would be practical. Thereafter such works could serve no useful purpose except as a factor of safety for use in the event that there should be a general breakdown in the sewage disposal plants, which complainants felt to be so remote a contingency as not to be worthy of consideration, but which defendants professed to fear. If defendants' fears were well founded, complainants submitted that defendants could readily construct control works merely as a standby factor of safety.

The complainants submit that on the testimony in this case the inclusion of such works is not only not essential, but is legally inadmissible, because they are not in the interests of navigation; because they can not be substituted in abridgment of complainants' rights for water filtration works or other measures, and because their purpose is to continue and not terminate the diversion.

II.

NO DIVERSION OR FLOW AT LOCKPORT IS NECESSARY OR LEGALLY ADMISSIBLE FOR THE PURPOSE OF MAINTAINING NAVIGATION IN THE CHICAGO RIVER AS PART OF THE PORT OF CHICAGO, OR FOR ANY OTHER PURPOSE, UPON THE COMPLETION OF THE PROGRAM OF PRACTICAL MEASURES OUTLINED BY THE SPECIAL MASTER (LESS CONTROL WORKS) OR OF THAT PROGRAM (LESS CONTROL WORKS) SUPPLEMENTED BY OTHER AVAILABLE PRACTICAL MEASURES.

The FOURTH question submitted on Re-Reference by this Court was:

> "What diversion, if any, will be necessary for the purpose of maintaining navigation in the Chicago River, as part of the Port of Chicago, after the practical measures for the disposition of the sewage without diversion have been completed and placed in full operation?"

In answering this question, the Master held that the defendants were entitled as a matter of law to divert the domestic pumpage from the Great Lakes-St. Lawrence Watershed, and that with or because of this diversion an additional 1500 second feet of water should be diverted in the interests of navigation in the Chicago River as part of the Port of Chicago. (Master's Report 138.) In discussing the basis of his conclusion that some diversion should be allowed subsequent to the completion of the program, so as to guard against the possibility of any interference with navigation, the Special Master said:

> "It seems to me that the best way and the reasonably sure way, of accomplishing this result is to permit an outflow from the Drainage Canal at Lockport." (Master's Report 137.)

Again on page 138 the Master said:

> "As to the water supply, it is urged that water filtration plants should be constructed. The fact remains that the effluents from the sewage treatment plants and the storm water must go somewhere, and if they are taken away from the Lake and discharged through the canal at Lockport, both the danger to the water supply will be removed and conditions suitable to navigation can be maintained."

It is thus clear that the Master did not base his conclusion upon the belief that some diversion was the only way of preventing interference with navigation but upon the ground that, in the exercise of discretion by him, he thought it would be a simple method of safeguarding the water supply without filtration works and insuring the maintenance of suitable conditions for navigation. Complainants submit that this Court did not delegate to the Master on this Re-Reference the power or duty to exercise his discretion whether the protection of navigation and/or the public health should be accomplished by diversion or by other practical measures. The question required a determination of whether any diversion in the interests of navigation would be necessary with the completion and operation of every practical measure available to avoid any necessity of diversion as an incident to the disposal of the sewage of Chicago. The answer obviously does not rest upon such a basis and is not responsive to the order of Re-Reference.

In further exposition of his finding, the Master at pages 139-140 of his report bases his conclusion, allowing the diversion of the domestic pumpage and 1500 c.f.s. of additional water from the Great Lakes watershed, upon an alleged balancing of equities between States. He thereby justifies his allowance of this diversion, not for the maintenance of navigation in the Chicago River but as a matter

of right in the defendant State. The Master in his Original Report found that the State of Illinois had no power to divert water from the Great Lakes-St. Lawrence Watershed as against the complainant States and that finding was confirmed by this Court. (278 U. S. 367 at 417.) His later conclusion would overrule the previous decision of this Court. From the standpoint of equity, a conclusion so based would not only authorize the State of Illinois to withhold its entire natural contribution to the Great Lakes System (503 c.f.s., Master's Original Report 23) but it would authorize the State of Illinois to abstract in addition from 2 to 5 or 6 times the amount of its natural contribution to this waterway, (depending on whether the domestic pumpage be included) and which additional water was contributed by the lower riparian States, and would never have been within the boundaries of the State of Illinois except for this unlawful act. No equity to thus take the waters of the complainant States can be founded upon a claim that such water will be or is useful to the appropriator. In view of the vast damage shown in this case and found by this Court, it could not be said that the expense which the defendant would save by the appropriation of such water would exceed the damage inflicted upon the complainants. But if that be assumed, a State can not justify the taking of waters of another State upon the ground that it can derive a greater profit from their use than could the rightful owner. *Wyoming v. Colorado,* 259 U. S. 419, 468-9. Certainly, as far as these waters were contributed by lower riparian States and were not naturally tributary to the State of Illinois, what such complainant States have, they may keep and give no one a reason for their will. *Hudson County Water Co. v. McCarter,* 209 U. S. 349.

However, laying aside all such facts and principles, this Court by its order of Re-Reference did not delegate to

the Special Master the discretion or duty to apportion the waters of the Great Lakes System between the complainant States and the State of Illinois either on the basis of use which he might think most beneficial or on any other basis. This Court did not delegate to the Special Master the discretion or duty to determine whether in his opinion the rights of the complainant States and the natural advantages of their position as members of the Union should be abridged or denied either for the purpose of relieving the defendants of additional expense in the disposal of the sewage of Chicago through other means than Lake diversion, or to fulfill any alleged desire of the defendants to create super-conditions at Chicago at the expense of the complainants. We submit that this exposition by the Master of the basis upon which his conclusion rests demonstrates that it is without legal basis and not responsive to the mandate of Re-Reference issued by this Court.

Moreover, the complainants believe that the Master, in his consideration of this question, erred throughout in treating the issue as though the burden of proof rested upon the complainants. This Court held that no diversion was admissible in the interests of sanitation and that the defendants must provide some method of disposing of the sewage other than promoting or continuing the existing diversion. If any diversion, therefore, were to be justified by reason of or as incident to the disposal of the sewage, the burden was on the defendants to establish both its necessity and extent as an equitable defense *pro tanto*. While complainants submit that a consideration of the evidence hereinafter discussed, overwhelmingly establishes that no necessity for diversion to maintain navigation in the Chicago River will exist, they believe that the Master did err in treating the subject as though the burden of proof rested upon the complainants.

A.

The scope of the determination to be made in answer to the FOURTH question.

This Court expressly held that the Congress had not attempted to authorize any diversion for navigation purposes on the Illinois or Mississippi Rivers and that no diversion of water for such purposes could be allowed in this case. *Wisconsin v. Illinois,* 278 U. S. 367, at 417. The Special Master on Re-Reference has specifically found that there has been no subsequent action by the Congress, (Master's Report 122). The question, therefore, here to be determined is solely whether on the completion of this program, the diversion of any quantity of water will be required in order to maintain such navigation as may use the Port of Chicago and the Chicago River in connection with the Great Lakes-St. Lawrence System. *Wisconsin v. Illinois,* 278 U. S. 367 at 418. However, it may be noted that there is no navigation in any practical sense coming into the Chicago River by way of the Illinois Waterway or the Illinois-Michigan Canal. (Ex. 102; Appendix p. 101; Woerman, Appendix p. 102.) Only a few canoes and small pleasure craft have passed through the little lock of the Sanitary District. (Master's Report 122.)

It is uncontroverted and incontrovertible that with the cessation of all flow at Lockport, navigable depths will be increased in the Chicago River and the Drainage Canal because of the reversal of slope which will be incident to the restoration of the natural flow of the Chicago River into Lake Michigan. (Jadwin, J. A. 9-10, 16-17, 19, 31; Col. Townsend, J. A. 240-1; Gen. Keller, J. A. 400-1.) The inquiry is then immediately reduced to the question of whether any diversion of water is necessary after completion of this program in order to prevent a nuisance which will obstruct navigation in the Chicago River as part of the Port of Chicago.

With the completion of practical measures recommended by the Master (less control works) or of complainants' program, for the disposition of the sewage without diversion and no flow at Lockport, no interference with or obstruction in fact to navigation or navigable capacity will be created in the Chicago River as part of the Port of Chicago.

While be believe (See pp. 74 to 75 *infra*) that Congress has authoritatively determined that, as a matter of law, there could be no obstruction to navigation or navigable capacity in the Chicago River from the discharge of liquid sewage or effluent, we proceed to discuss whether upon the completion of the Master's program (less control works) or such program supplemented by other available practical measures, and no flow at Lockport, there will be any nuisance in fact created in the Chicago River, which will constitute an obstruction to navigation or to its navigable capacity.

Assuming, solely for the sake of argument, that the Court, in adverting to the possibility of some negligible quantity of diversion being necessary to maintain navigation in the Chicago River, referred not merely to the preservation of adequate depths and widths, but to the prevention of any nuisance conditions arising from the disposal of the sewage which could create an interference with, or obstruction to, navigation or navigable capacity, complainants assume that the Court did not have in mind any fanciful standard for the Chicago River, but intended simply to secure practical conditions which have been found adequate for navigation in line with the experience in navigable harbors generally.

While defendants originally contended that the discharge of the entire volume of raw sewage into the Chicago

River did not create any interference with navigation, ever since this Court held that diversion for sanitation is illegal and inadmissible, defendants have steadily attempted to create an impression that in order to maintain navigation at Chicago, it is necessary to eliminate all possibility of contamination of the water in the River, no matter how negligible, so that in effect it may be as pure as it was when there was no city of Chicago. If the contentions of the defendants were correct, there would be no free and unobstructed navigation at any of the substantial ports of the United States, and navigation, instead of growing upon the lakes and elsewhere, would have died out long ago, as the cities continued to grow. On the contrary, it has increased by leaps and bounds.

In *New York v. New Jersey*, 256 U. S. 296, the Federal Government, with the consent of this Court, approved the discharge of the sewage into New York Harbor, with simple preliminary treatment for the removal of coarse material. This establishes the fallacy of contending for any such fanciful standards as suggested by the defendants. If the method of discharge used in New York Harbor did not constitute an interference with navigation, clearly the discharge of a purified effluent can not be held to do so.

We believe that the testimony in this case establishes that with the completion of the practical measures, (described in the program of the Master) for the treatment of the sewage and no flow at Lockport, conditions in the Chicago River will be more than adequate for maintenance of navigation. However, if that limited program of practical measures would not accomplish that result, or if an unusual standard of purity is to be required at Chicago, then the other practical measures hereinafter indicated must be added thereto. We proceed to analyze, briefly, the testimony upon this point.

Testimony supporting conclusion that no diversion is necessary.

Colonel Townsend, a man with 45 years' experience in the Engineer Corps on river and harbor work in the United States, testified that with the completion of complainants' program, no flow at Lockport will be required to maintain navigation in the Chicago River. (J. A. 244-248; 257-8.) In fact, he testified that the termination of flow at Lockport would improve navigation on the Chicago River by removing the current and its impediment to navigation, (J. A. 247), and that the question of whether sewage is discharged into a river or harbor would not be one consideration in planning an improvement. He held this opinion even though there were no sewage treatment, although he was aware that treatment would remove a great deal of the solids. (J. A. 247-8.) Shoaling comes largely from street wash, carrying sand and similar material and not from domestic sewage. (J. A. 250.) In any event such deposits are dredged out of all harbors in the regular course of maintenance. (J. A. 258.)

General Keller, a man with 33 years' experience in the Engineering Corps on river and harbor work in the United States, and with subsequent experience on harbor work and problems on the Great Lakes since his retirement, testified that with the completion of this program no flow at Lockport will be required to maintain navigation in the Chicago River. (J. A. 401.) Navigable depths would be increased and the currents decreased. (J. A. 401.) General Keller pointed out that in no case in his knowledge had pollution or absence of pollution in a harbor or port affected navigation or traffic by water. (J. A. 405.) Clearly then the purified effluent would have no adverse effect. When both freight and passenger traffic has plied the port of Chicago for 30 years while it was admittedly in a state of gross pollution from unpurified sewage, it seems ironical, to

say the least, to suggest that the purification of the sewage would destroy this traffic.

Captain Inches, a Lake Captain, testified that he has never experienced any interference with or obstruction to navigation from pollution on the Great Lakes, even though there was no sewage purification, but that he has experienced great difficulty by reason of the obstructive currents in the Chicago River, and that the elimination of the current through cessation of diversion will render navigation in the Chicago River much less difficult and expensive. (J. A. 239-241.)

Major Putnam, while U. S. District Engineer at Chicago, said in his official report on the diversion of Water from Lake Michigan in 1923. (Exhibit 1, Original Joint Abstract[1] 179.)

> "As far as the navigation of the Chicago River and the Drainage Canal is concerned, if the flow at Lockport were entirely throttled and the power-house gates closed so as to permit no diversion from Lake Michigan, conditions would be decidedly improved. The current which now averages 1½ miles per hour and in some bridge draws is as high as 4, would be practically eliminated, making navigation considerably simpler, especially for the larger vessels whose passage through a narrow bridge draw is apt to increase the current materially." (pp. 59-60.)

This opinion was expressed by Major Putnam when there was no sewage treatment at Chicago. Major Putnam, appearing as defendants' witness at the hearing at Chicago last March, reaffirmed the correctness of that statement. (J. A. 99.) Obviously with complete treatment conditions will be further improved.

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[1] For convenience of citation, the Joint Abstract filed with this Court on January 24, 1928, is cited as "Original Joint Abstract" in contra-distinction to the Joint Abstract filed February 20, 1930, which is merely denominated "Joint Abstract."

All of the complainants' witnesses testified that with the completion of this program and no flow at Lockport no nuisance will be created in the Chicago River and no interference with navigation. The Sanitary Engineers testified that conditions would be satisfactory both from the standpoint of navigation and public health. (Howson, J. A. 108-9, 639; Gascoigne, J. A. 207, 209; Townsend, D., J. A. 214, 215, 216, 218; Ellms, J. A. 227-8; Townsend, Col., J. A. 246-7; 257-8; Inches, J. A. 240-241.) While such standards are purely fanciful so far as determining whether an obstruction to or interference with navigation will be created under the conditions assumed, the complainants' witnesses testified that such conditions would meet the hypercritical standards assumed by the witness Eddy. There would not be any odors arising from the Chicago River due to putrefaction of organic matter contained in the sewage effluent. (Howson, J. A., 108; Gascoigne, J. A. 209; Townsend, D., J. A. 215.) There would be no visible suspended particles in the Chicago River recognizable as of sewage origin. (Howson, J. A. 108; Gascoigne, J. A. 209; Townsend, D., J. A., 215.) There would not be any oil, grease or floating material on the surface of the Chicago River arising from the flow from sewage treatment plants. (Howson, J. A. 108; Gascoigne, J. A. 209; Townsend, D., J. A. 215.) These questions were based upon the fanciful standard assumed by the witness Eddy. (J. A. 76-8.) Of course, oil and such materials may come from vessels or oil tanks, if no steps are taken to eliminate such sources of pollution, whether there be diversion or otherwise; and it would be impossible for any witness to state that there would be no material or pollution from such sources with or without diversion. The waters would not be offensive to or injurious to the health of passengers or people employed on boats or docks. (Howson, J. A. 108; Gascoigne, J. A. 209; Townsend, D., J. A., 216.) The conditions would not

produce an excessive growth of water plants. (Howson, J. A. 108-109; Gascoigne, J. A. 209; Townsend, D., 216.) An inspection of the effluent of an activated sludge plant shows that it is as good in appearance as lake water. (See Eddy, Master's Report 30.) That is greatly superior to the waters in any harbors on the Great Lakes where there is no sewage treatment. The effluent is stable, clear, odorless and sparkling; it will remain stable indefinitely. (Howson, J. A. 110; Gascoigne, J. A. 210; Townsend, D., J. A. 216.)

All of the foregoing witnesses (except Colonel Townsend and Captain Inches, who are not sanitary experts,) testified that with completion of this program and no flow at Lockport, there would be no nuisance from the standpoint of sanitation. The following witnesses also so testified: (Waring, J. A. 239, 613; Rockwood, J. A. 591). That is not an issue on this Re-Reference, but it is clear that if there is no nuisance from the standpoint of sanitation, there certainly can be none from the standpoint of navigation.

The defendants' Sanitary Engineer Pearse testified before a Committee of Congress in 1924. In his testimony before the Committee, which he reaffirmed in this suit, he stated that the effluent of a sprinkling filter or activated sludge plant is fit to run down a stream *without* dilution. He reaffirmed that fish were living in the effluent of Sanitary District trickling filters, right at the filters. (Master's Report 29, J. A. 520.) He stated further, (J. A. 521):

> "The biological processes, such as sprinkling filters, or activated sludge, when properly operated, produce a high grade effluent, *requiring no dilution, in which fish can live. The effluent, further, will create no nuisance, and can be turned into a water course, even though dry, without fear of consequences.*"

Can it be reasonably contended that such an effluent would not be fit to use for the flotation of vessels, or that it would not be better than the waters in any one of the

important harbors on the Great Lakes under present conditions? Moreover, the effluent will not be turned into a dry run (which Pearse says will create no nuisance) but will obviously be diluted with water by seiches, rains and natural run offs. It should be noted that this witness did not undertake to state on the Re-Reference that any quantity of diversion would be necessary in order to maintain the waters of the Chicago River in a suitable condition for navigation.

The testimony of Mohlman, Eddy and Jadwin.

The Master has referred to the testimony of the witness Mohlman. This witness was first asked to testify to investigations at Milwaukee, but when these investigations were ruled inadmissible by the Master, the witness was asked to express an opinion upon Chicago conditions. The sum total of his testimony on direct was that he did not have sufficient knowledge with reference to the controlling factors to determine what conditions would exist after completion of the program with no diversion, but that he thought they would not be satisfactory without some diluting water, although he was not in a position to make any determination on the point. (J. A. 342, 343-4.) He also testified that an activated sludge effluent is not clear and odorless. (J. A. 346.) If he was mentally taking refuge in the technicality that all water contains some small quantity of suspended material, he would probably be technically correct. Under such an hypothesis, that answer would apply to the best drinking water in the United States. On cross examination he admitted that turbidity is a measure of the clearness of a liquid. (J. A. 346.) He admitted that the turbidity of an activated sludge effluent is about 20. (J. A. 346.) He admitted that the maximum turbidity of the Chicago drinking water in April 1927 was 115 and that the average for the month was 50. (J. A. 346.) This in-

dicates that the drinking water in Chicago in April 1927 averaged 2½ times as much suspended material as an activated sludge effluent. Turbidities for the Chicago water supply exceeding 20 (exceeding 50 at some intakes), have commonly prevailed for 50 to 90% of the time during some months. (Ex. 1157, p. 25; Appendix pp. 102-3.) Yet the witness states that the effluent is not clear. It is contended that it is not fit to float a boat. The witness agreed generally with Eddy's statement that an activated sludge effluent is as good in appearance as lake water. (J. A. 347.) He agreed generally with Eddy's statements that an activated sludge effluent is clear, colorless, odorless and stable. (J. A. 347-8.) He agreed generally with Fuller's statement that an activated sludge effluent is well purified, non putrescible and freed of 95 to 98% of its bacteria. (J. A. 348.) He admitted that the B Coli are not more resistant than other bacteria. (J. A. 348.) Under these circumstances it can hardly be said that he has produced any evidence upon which an interference with navigation could be predicated. He did not discuss navigation.

The only witnesses testifying that any diversion would be necessary in the interests of navigation in the Chicago River were the witnesses Eddy and Jadwin. After giving his original testimony at Chicago, Eddy apparently undertook to work out some sort of scheme to which he could hang a conclusion that a diversion of 2,000 c. f. s. would be required to prevent any interference with navigation. He returned to the stand with a list of seven or eight requirements (J. A. 76-78) which he admitted, as far as he knew, had never been met in any other harbor of the Great Lakes. (J. A. 85-86.)

Although it has been shown that these requirements will be met, (*supra*, pp. 47-8) on what does this claim for superior treatment of Chicago waters at the expense of the complainant states rest? We have no right to criticise any

effort of any city to provide super conditions for itself at its own expense, but it hardly seems reasonable that a city can lay the foundation for the right to injure others by asserting an alleged desire to create a condition greatly superior to that which exists in other cities or harbors of the United States. With what Chicago creates for herself, we are not concerned. With what she appropriates from complainants, we are. *Moreover with what ports is this navigation at Chicago to be carried on, since the conditions set up as necessary exist nowhere else?* However, accepting the standard set forth by the witness Eddy, it is the unanimous testimony of all the other witnesses in the case who have testified on the point (with the exception of General Jadwin, whose testimony will be discussed later), that with the completion of this program those conditions will be met without any flow at Lockport. (See pp. 47-8, *supra.*)

Eddy testified (quoted by the Special Master, Master's Report 129-30):

> "The discharge of the effluent from the various works to be completed under the program into the Lake, would be detrimental to navigation. The effluent would be devoid of oxygen, black and offensive much of the time. It would tend to discolor light-colored paint on boats. It would be offensive to people riding on boats and having to work on the vessels and along the wharves. This condition would gradually decrease in intensity as the distance from the mouth of the river increased, due to the dilution and oxidation which would take place in the waters of the Lake. And in reaching the above conclusion, I assumed that the storm water would be discharged to the Des Plaines River, and that the effluent from purification works in dry weather time would flow into the Lake." (J. A. 75-76.)

Let us compare this testimony with Eddy's statement of November 12, 1919, to the Board of Estimates of the City of Milwaukee:

"The activated sludge system will produce an effluent which is,—speaking, now, in general terms,—*as good in appearance as the lake water itself.* It won't show material color—it won't contain a noticeable quantity of suspended matter. It will be very low in bacteria, although in that respect there will be more than there are in the normal lake water, of course; it does not completely sterilize the sewage; *and in all respects is an effluent which ought to be absolutely satisfactory. I think that there can be no question upon that point.*" (Master's Report 30.)

His statement should also be compared with his statements mentioned in the cross examination of the witness Mohlman. (Page 50, *supra.*) Has the efficiency of the activated sludge process deteriorated since 1919? Is the effluent of an activated sludge plant in Milwaukee "as good in appearance as the lake water itself," and "absolutely satisfactory," but at Chicago "devoid of oxygen, black, and offensive"?

The only other testimony is that of General Jadwin, then Chief of Engineers, who was called by the Special Master. General Jadwin admitted that with cessation of all flow at Lockport the widths and depths of the Chicago River and Drainage Canal available for navigation would be increased and that under such circumstances the only question relating to the maintenance of navigation in the Chicago River as part of the Port of Chicago was whether with no flow at Lockport any nuisance would be created in the Chicago River which could be obstructive to navigation. (J. A. 9-10, 12-13.) *He admitted that he was not an expert and had no technical knowledge which would enable him to express an opinion whether any such nuisance conditions would develop, and that he was not competent to advise the Court.* General Jadwin stated (J. A. 16-17):

"I was directed by the Special Master to answer, ignoring the Illinois Waterway and limiting myself for

the moment to the Chicago River. It is true that neither now nor when all the treatment plants are completed, will there be any diversion necessary as a matter of providing adequate depths in the Chicago River. This is correct referring simply to depths of the Chicago River. But if you mean simply depths in the Chicago River, it is true. If you limit your navigation to the Chicago River and accept the thought of barring out of it that navigation *which I think should come through there,* then the sole problem is what dilution, if any, will be required for the effluents of complete treatment to prevent an active nuisance in the Chicago River as far as the Chicago River is concerned. *I think it is correct that as to the quantity of dilution water from the Lake, if any, which is necessary when complete treatment plants are in operation, in order to prevent any active nuisance, I am not an expert and am not able to advise.''*

See also J. A. 39-40.

It is, of course, no reflection upon General Jadwin that he is not qualified to express an opinion or advise upon this technical sanitary question which is peculiarly one for sanitary experts. The officers of the Corps of Engineers of the War Department are not sanitary experts and could not be fairly expected to express an opinion outside of their own field. General Jadwin's cross examination abundantly supports his frank admission that he was not qualified to advise the court on this point, and conclusively establishes that his written statements, no doubt prepared in an effort to be of as great assistance as possible, could not be made the basis of any finding of fact upon this point. (J. A. 2-17; 22-27; 33-42.)

General Jadwin was not sure whether he had ever seen the effluent of an activated sludge plant and admitted that he did not know its characteristics. (J. A. 33, 34, 39-40.) When he was asked to state of what his nuisance or obstructions to navigation would consist, he could state no

single element of a nuisance. (J. A. 37-40.) His only answer was that if conditions were insanitary for people on shore, then they would be worse for the navigators. (J. A. 35, 38, 39.) Since he did not know, and had no means of knowing, whether conditions would be insanitary for people on shore, we are left quite in the dark as to how he concluded that they would be insanitary for navigators. He did not know whether in reaching his conclusion he assumed that there would be visible suspended material; whether he assumed the effluent would be putrescible; whether he assumed that it would give off an offensive odor, or any other element of a nuisance. He finally admitted that he not only had no scientific qualifications to pass upon the question, but that everything which he stated was based upon his reading and understanding of Master's Exhibit "B"—the Alvord, Burdick & Howson Report. (J. A. 35, 39-40.)

It is obvious that he had no qualifications to assist the court in interpreting this Report. He admitted that he had not considered any of the fanciful conditions suggested by the witness Eddy, and did not know whether they would be met or not. (J. A. 37-40; compare Eddy 76-78.)

The Special Master has quoted the original statements which were prepared in the Department, and read by General Jadwin before the Master, but not, of course, his cross-examination. It is obvious that the Special Master's finding on this point is based largely upon these statements read by General Jadwin. We submit that if General Jadwin had not occupied an official position and had shown no other or additional qualifications than are shown in this record, he would have been ruled incompetent to express an opinion on this scientific question. Can the rights of these states and their millions of people be abridged upon the testimony of a witness who, however brilliant he may be in other fields, has frankly admitted himself to be both scientifically un-

qualified and lacking in familiarity with the facts which are known to interested laymen, simply because he holds an official position with the War Department of the United States?

Even laying aside the fact that General Jadwin by his own statement was not competent to express an opinion, his conclusion could not be given any weight because it is based upon false premises of fact and law. The only basis for his conclusion was that accepting an assumption (of which he had no knowledge) that conditions would be insanitary for people on shore, then they would be insanitary for navigators. (J. A. 35, 38, 39.) He failed to understand that the sanitary question involved, as it related to the people of Chicago, was concerned only with the protection of the domestic water supply. The necessity of protecting the public water supply did not, of course, turn upon whether the consumers lived along the banks of the River, or elsewhere. No sanitary or health expert in this case has even suggested that the carrying out of this program, without any flow at Lockport, would be injurious to or affect the people living along the shore. Due to his lack of familiarity with sanitary questions he erroneously assumed that the question relating to the public health at Chicago had to do with the health of the particular people who lived along the shores of the River. The witness, therefore, not only based his conclusion upon a complete misunderstanding of the subject of debate, but upon a false premise not supported by any evidence in the case, even though unknown to him.

However, we think General Jadwin's testimony does demonstrate what controlled him in his conclusions. It involved a false assumption of law. When he was confronted with a statement of Major Putnam that if all flow at Lockport were terminated, navigation on the Chicago River and Drainage Canal would be decidedly improved, and that with

practically no sewage purification, General Jadwin stated that he did not quite agree. General Jadwin said (J. A. 11-12):

> "I do not think that is entirely correct. * * * I do not think the statement is quite right in the way we are looking at it now, *but from what that man had in mind in writing that, it is probably correct.* He had something different in mind from what I had in mind. I think he had in mind that shutting off the sewage from getting down there, there would be no offense from sewage. *I have in mind that if you shut off the connection, you shut off the navigation already authorized by Congress, which we are doing under the existing project.*"

In the first place, the statement is in error because there is no authorization for diversion for navigation by Congress which the witness subsequently admitted when interrogated by the Special Master. (J. A. 20, 45; Master's Report 122.) But this testimony does show the thing that permeates the whole of the testimony of General Jadwin. That is, that what he is really thinking about is some quantity of water which he has conceived to be desirable for the purpose of navigation on the Illinois waterway and the Illinois River. But the testimony just quoted shows that General Jadwin's only reason for disagreeing with Major Putnam was that he thought it would prevent the passage of navigation from the Illinois River and waterway into the Chicago River. Since that was his only reason, he must have agreed that considering the Chicago River and Drainage Canal alone, the cessation of the flow at Lockport would decidedly improve navigable conditions and that with practically no sewage treatment. Obviously General Jadwin conceived that if he were to testify that no diversion was necessary, it might bar the utilization of any Lake water for through navigation to the Illinois, if and when Congress should authorize it. He did not realize that this suit had no bearing upon that question, if Congress has the power and should

attempt so to act. General Jadwin seemed to feel that, because he had been called by the Master and was Chief of Engineers, it was his duty to state what he conceived to be the present position of his Department, not realizing that the object of the inquiry was not to ascertain his personal or other position, but to ascertain the facts.

Master's Exhibit B, Alvord, Burdick & Howson Report.

Finally General Jadwin admitted that he had no information whatsoever except what might be contained in Master's Exhibit "B"—the Alvord, Burdick & Howson Report. (J. A. 39-40.) In the first place this Report (Exhibit B) had no relation to the Chicago River, but only to conditions in the upper Illinois and Des Plaines Rivers. In the second place it did not purport to define conditions necessary to maintain navigation anywhere, but was based on an entirely different standard. It was also a technical report to which, we submit, nothing could be added by a statement of a non-expert as to his understanding of it. This is made clear from an analysis of the report.

In the first place, the pollution requirements set forth in that report (Master's Ex. B; J. A. 114-191) are to maintain a certain standard in the upper Illinois and Des Plaines Rivers. (Ex. 274; J. A. 398; 114-115.) With the cessation of flow that question no longer gives rise to concern. In the second place, the War Department required the sanitary engineers to adopt a standard which would permit the re-establishment of a thriving fish life in a river which had had no fish life for 25 years and which contained great sludge banks from the sewage of Chicago, which would continue to putrefy and render the waters inimicable to fish life for an indefinite period of time to come, even with the cessation of sewage pollution. (Ex. 274; J. A. 398, 113, 647-8, 126, 136.) The Sanitary Engineers had no part in setting up this standard. (J. A. 113, 643.) A standard which will main-

tain, much less re-establish a thriving fish life is very different from one which requires the absence of nuisance. This has not been controverted by any of the Defendants' witnesses. The former is a much higher standard, which is neither required nor adopted in practice to satisfy sanitary and health requirements nor to prevent interference with navigation. (Howson, J. A. 109, 647-8; Gascoigne, J. A. 209-10; Townsend, D., J. A. 216, Ex. B. 152-3.) General Jadwin admits that he does not know the difference between these standards; but that, if no obstructive nuisance is created, the conditions will be satisfactory for navigation even though fish life is not restored. (J. A. 26.) The great difference in these standards is obvious from the fact that an activated sludge effluent contains about 20 parts of oxygen per million. Of this oxygen 5 parts per million are in the form of dissolved oxygen and the balance in the form of nitrates and nitrites. (Mohlman, J. A. 349-50.) To maintain and much less to re-establish a thriving fish life requires that there shall always be a residual of at least three parts per million of dissolved oxygen. But an effluent will not putrefy or give rise to a nuisance until it has exhausted, first, the dissolved oxygen in the water (J. A. 647-8) and second, the oxygen contained in the form of nitrates and nitrites. (J. A. 647-8.) Hence, if the effluent should absorb over two parts per million out of the 20 parts per million of the available oxygen, fish life would be killed; but no nuisance would be created until after 20 parts per million had been exhausted by the oxygen demand. Moreover, a large factor of safety is required in the case of fish life because a short lapse from the standard will destroy fish life which can not be readily resurrected. (J. A. Howson 648.) However, if a standard of no nuisance should temporarily fail, it would only result in a slight nuisance for a very short period of time and with no continuing effects. (J. A. 648.) All of the flows considered in this report were measured at

Lockport and included the domestic pumpage. (Ex. B., J. A. 115, 155.) The analysis of these flows was based upon oxygen requirements to meet this hypercritical standard during July and August, the months of maximum oxygen demand of the effluents and sewage and minimum oxygen content of diluting waters; so that the determinations represented the maximum and not the average flows required to meet that standard under the conditions assumed. (J. A. 125-6, 144-6.) All conclusions were affected and governed by these considerations, as well as the requirements of restoring a thriving fish life, which far exceeded the requirements for establishing sanitary conditions or preventing a nuisance obstructive to navigation. (Joint Abstract 643, 647-8, 109, 209-10, 216.) Under the contract standard oxygen available in the effluents and from re-aeration to prevent nuisance or insanitary conditions could not be utilized. Obviously, however, neither the Federal Government nor the Complainant States are under any obligation to restore to Illinois the fish life which she has destroyed.

General Jadwin's cross examination shows that all of the foregoing factors were unknown to him. He admits that sewage passes largely untreated into all of the other harbors of the Great Lakes (J. A. 26). Yet he asserts that the purified effluent would destroy or obstruct navigation at Chicago.

The Official Reports and Documentary Evidence.

The untenable character of this conclusion is thus established by the fact that if it be sound, there is not any free and unobstructed navigation in the United States. The weight of any such contention on the part of the former Chief of Engineers could not but be further minimized by a consideration of the fact that the Chicago River and the auxiliary waters at Chicago have been grossly polluted with raw, untreated sewage for 30 years. During that period of

time the War Department never took any steps to force the cleaning up of the Chicago River by the Sanitary District until the Permit of March 3, 1925. A casual reading of the long series of reports by District Engineers at Chicago, the particular report upon which that Permit was based, the recommendation of the then Chief of Engineers, the letter of the Secretary of War, and the diplomatic correspondence with Great Britain, demonstrates that the step taken in the Permit of March 3, 1925 was not for the purpose of removing an obstruction to navigation in the Chicago River, but for the purpose of reducing the injurious effect of the diversion on the Great Lakes by cutting it down; and the requirement for sewage treatment was to the end that this reduction might be had without danger to the health of the City of Chicago, which was the club that the Sanitary District had held over the Secretaries of War for 25 years for the purpose of entrenching itself in this unlawful diversion. The reduction was limited by the sanitary emergency at Chicago and not by the needs of navigation. (Master's Original Report 71-2, 76-80, Original Joint Abstract 181, 182, 133-138, 140-158; 169-173, 179.) Suddenly we find, since this Court has ruled that diversion for sanitation is inadmissible, that we must have waters at Chicago,—although not any place else,—which are entirely free of any sewage pollution, no matter how negligible, or navigation will be destroyed. The mere statement of the contention refutes it.

The untenable character of General Jadwin's conclusion is also established by the fact that from the earliest reports down to the testimony of General Jadwin in this case a long line of distinguished engineers, who were acting in the line of duty as members of the Corps of Engineers, have consistently and repeatedly reported to the Congress that a total flow of 1000 second feet or less from the Great Lakes watershed would be ample for all navigation requirements upon a waterway from Lake Michigan through the Des-

Plaines and Illinois Rivers to the Mississippi. (Original Joint Abstract pp. 35-46; J. A. 60-65.) In the latest comprehensive report transmitted to Congress March 29, 1926, and being House Document 4, 69th Congress, 1st Session, the Board of Engineers of which General Jadwin was senior member, advised Congress that an adequate waterway could be obtained with a total diversion or flow of 1000 second feet. (Ex. 18, Original Joint Abstract, pp. 37, 38.) This view was confirmed by General Taylor, then Chief of Engineers, both in transmitting the foregoing report and in his testimony before the Committee on Rivers & Harbors of the House of Representatives in 1926. (Ex. 209, Original Joint Abstract, pp. 35-36.) The view was reaffirmed by both General Taylor as Chief of Engineers and General Jadwin as senior member of the Board in Senate Document 130, 69th Congress, 1st Session, dated June 16, 1926. (Ex. 249, J. A. 60-65.) House Document 4, 69th Congress, First Session (Ex. 18), was again reviewed in House Document 12, 70th Congress, First Session dated May 11, 1928, and the various plans for a waterway including one with a total flow of 1000 second feet were again set forth in that report. (Ex. 276, page 18, Master's Report 124.) In discussing the Chicago Drainage Canal the Special Board reporting in Exhibit 276, (Master's Report 124) states:

> "However, since this is a lake-level canal no discharge is actually necessary for its use for navigation as distinct from sanitary uses except for the lockages at Lockport."

This report was transmitted to Congress by General Jadwin, as Chief of Engineers, with his approval.

Can it be supposed that all this long line of eminent engineers, including General Jadwin himself, would have consistently advised the Congress that it would be practicable to construct such a waterway with 1000 second feet or less, at times when there was no sewage treatment, if the limita-

tion of the flow to 1000 second feet would, as General Jadwin has testified, create conditions which would obstruct and destroy navigation in the Chicago River and throughout all of the reaches of the proposed waterway? Can it be believed that General Jadwin would have joined in advising the Congress to, or at least that it would be practical to, adopt a project upon which no navigation could be carried on and which would also under the theory advanced by General Jadwin in his testimony, destroy any remaining commerce in the Chicago River? Yet, if General Jadwin's testimony were correct, all of these engineers would have been advising Congress to adopt a project which would be utterly worthless. Such a conclusion is unbelievable.

Defendants introduced Exhibit 1413, which was a report of the Chief of Engineers to the Congress, entitled "Navigable Waters of the United States and Non-navigable Waters connecting therewith into which polluting substances are being deposited to such an extent as to endanger or interfere with navigation, commerce or fisheries." It is significant that this comprehensive study of 127 harbors or waterways, of which all are polluted with domestic sewage, industrial wastes, or both, shows that in 102 of these harbors or waterways, there is no effect on commerce or navigation. (J. A. 46-47.) The Exhibit shows that in the 25 harbors or waterways on which interference is reported, the interference is confined in practically every instance to interference with pleasure boating and a few cases of shoaling from sewage sludge which is largely dredged out by local authorities. (J. A. 48-49.) The greater number of these places are in the vicinity of New York Harbor, the New Jersey Coast and in the vicinity of Chicago and the Illinois River. Have there been any instances of obstruction of navigation in New York Harbor from sewage pollution? But the report is further illuminating. The Chief of Engineers said:

"3. In general the injuries caused by polluting substances in non-tidal waters do not, except in the Pittsburgh area, directly affect commerce or navigation *in the sense of making more difficult or expensive the movement of water carriers, the handling and transshipment of freight, or the creation, operation and maintenance of navigable channels.* The direct injury resulting from pollution in non-tidal waters is rather to the public health, to fish and other wild life, animal and vegetable, and to outdoor forms of recreation, such as bathing and boating, together with the land and property values which depend thereon."

"4. Water-borne commerce and navigation may be held to be indirectly affected on this latter basis, for in a sense they are affected by almost any important activity of the public."

* * * * *

"8. While at present there appears to be only one port on the Great Lakes in which oil pollution is sufficient to endanger commerce, nevertheless, due to the importance and extent of this commerce, and the probable increase in the number of oil-burning and oil-cargo vessels, oil refineries and terminals, pollution from this source may increase unless controlled." (J. A. 51-52.)

This report shows that except in the Pittsburgh area, there has been no case of pollution directly affecting commerce or navigation in the sense of making more difficult or expensive the movement of water carriers, the handling and shipment of freight or the creation, operation and maintenance of navigable channels. The interference in the Pittsburgh area is from the effect of acid wastes from mines on the hulls of steel vessels. Such a problem does not exist at Chicago but its solution would consist of elimination of the waste and not in its propulsion through other navigable waterways by diversion. This official report completely demonstrates that, even in the past, with the gross

pollution of the Chicago River without any sewage treatment whatsoever and with the gross pollution of the Illinois River, there has been no interference with navigation. Can anyone reasonably contend that with the complete purification of this sewage there will arise any interference with navigation? Under these circumstances it is idle to contend that any diversion will be necessary to maintain navigation on the Chicago River after the completion of this program.

The foregoing analysis of the testimony and evidence demonstrates that no diversion is necessary to maintain navigation in the Chicago River.

The foregoing testimony is believed to be all of the testimony bearing upon this question. We believe that an analysis of this testimony and a reading of the Master's Report discloses that his finding rests upon the testimony of the witnesses Eddy and Jadwin. Eddy, in his testimony, has described the effluent as black and offensive. Before the Common Council of Milwaukee he states that it is "as good in appearance as lake water" and "absolutely satisfactory" for the Milwaukee harbor, both for sanitation and navigation. He has based his testimony upon a hypothetical standard neither existing nor considered necessary in other harbors. General Jadwin admits that he is not qualified to advise the court, and shows a not unnatural lack of familiarity even with facts of the situation familiar to interested laymen. On the other side there is the testimony of the witnesses Hewson, Gascoigne, D. Townsend, Pearse and Fuller, Sanitary Experts; General Keller, Colonel Townsend and Major Putman, retired army engineers of wide experience; Doctor Rockwood, a Public Health Expert; Waring, Chief Sanitary Engineer of the State of Ohio with supervision of all of the water supplies, sewage disposal and stream pollution problems in that state, and

Inches, a Lake Captain of many years' experience. Howson, Gascoigne, D. Townsend, General Keller, Colonel Townsend, Major Putman, Waring and Inches have testified directly and positively that no diversion will be necessary to maintain navigation in the Chicago River. The testimony of Pearse, Rockwood and Fuller sustains the conclusion that no diversion is necessary. Some of these witnesses have testified that the termination of the diversion will greatly improve navigation in the Chicago River. In addition we have the reports of all of the most eminent Engineers of the War Department, covering a period of at least 35 years, and including the latest report signed and transmitted by General Jadwin himself advising the Congress that a *total flow* of 1000 c.f.s. at Lockport would adequately provide for through navigation to the Mississippi if Congress should choose to provide it. We have the exhaustive report of the former Chief of Engineers, General Taylor, showing that even without this sewage purification there has been no obstruction to navigation from sewage pollution in the navigable channels of the United States.

We submit that upon this record findings of any necessity for diversion to maintain navigation in the Chicago River after complete sewage treatment can not be sustained.

Not only is a finding that any diversion will be necessary to maintain navigation in the Chicago River after complete treatment of all the sewage unsustainable under the evidence, but the unreasonable and arbitrary character of such a finding is inherent in the very nature of the assumption upon which it is based. If the Chicago Drainage Canal had never been constructed, does any one imagine that an immense Drainage Canal or sluiceway would be cut across the Continental Divide, or would be deemed necessary, for the purpose of drawing off the waters of the Chicago River in order to maintain navigation in that River as part of the Great Lakes System? Sewage, large-

ly untreated, is discharged into all of the great navigable harbors of the world. Has there ever been another instance where it has been deemed necessary to construct a sluiceway to divert the waters of the harbor into a different watershed in order to maintain navigation in that harbor? Why is it that with complete treatment of all of the sewage at Chicago, it should happen that of all the harbors in the world, the harbor at Chicago is the only one where it is necessary to sluice off the waters into a different watershed in order to maintain navigation—indeed in order to prevent its absolute destruction under the testimony of General Jadwin. While it is immaterial, neither will the Chicago River be stagnant. In addition to the natural flow, the flow of the unconsumed portion of the domestic pumpage amounts to approximately 1700 c.f.s. This is larger than the low water flow of the Ohio River at Pittsburgh, and larger than the low water flow of many other large navigable rivers at their mouths during several months of the low water season.

C.

If it be assumed that the program of practical measures recommended by the Master is not adequate to prevent interference with navigation in the Chicago River as part of the Port of Chicago with no flow at Lockport, then other available practical measures must be included in the program; and with their inclusion, no claim of a necessity for any diversion to maintain navigation in the Chicago River can be supported.

With the completion of the sewage treatment works described by the Special Master with no control works and no flow at Lockport, only two possible sources of nuisance are suggested. They are:

First, that at times of storm water runoff in excess of the volume to be treated by the sewage treat-

ment works, a portion of the sewage will be carried into the River and auxiliary channels with the excess storm water, although in a high state of dilution, and that such portion of the sewage so carried in dilution with the storm water might create a condition of nuisance in the Chicago River; and

Second, that the discharge of the purified effluent of the sewage treatment works into the Chicago River and auxiliary channels at dry weather times with no diluting water might create a condition of nuisance in the River.

Complainants regard the claim of any nuisance from such conditions as wholly specious, unfounded and designed to promote or continue the present diversion. Even the treatment at times of storm of only 150% of the dry weather flow as provided by the method of operation suggested by the defendants, provides for the purification of the initial and most highly polluted runoff. (Pearse, J. A. 543.) Thereafter any sewage spilling into the channels with the storm water is necessarily in a highly diluted state and would not be visible. (Ellms, J. A. 228-9.) If this large storm water runoff, carrying a small quantity of sewage in dilution will not create a nuisance to navigation as it flows westward in the River through the power wheels of the Sanitary District, it is difficult to understand why the same liquid will create intolerable conditions for navigation in the Chicago River if it flows eastward through that River.

The Master has referred to the testimony of Darwin Townsend with reference to Milwaukee. (Master's Report 132-3.) The Milwaukee plant not only does not treat any storm water flow but at times of storm treats only 35% of the normal or dry sewage flow. (J. A. 222, 224-6.) This manipulation is solely due to the desire at Milwaukee to manufacture for profit a by-product fertilizer of a standard fixed by contract. (J. A. 224-5.) The conclusion from these facts is that conditions are satisfactory at Milwaukee

both from the standpoint of public health and navigation without any water filtration plant and with the treatment of less than the ordinary sewage flow at times of storm.

In passing, it should be noted that defendants persistently measure the quantity of sewage at Chicago by referring to an estimated human population, and a theoretical population alleged to represent the equivalent of industrial wastes. They then proceed to compare the grand total of these figures with the human population of other cities. This ignores the fact that all cities have industrial or trade wastes, and many cities have as large, or larger, loads than Chicago, in proportion to the population. (J. A. 218; Gascoigne, Appendix pp. 103-4.) This method of measuring the size of sewage plants is not employed elsewhere, and has been introduced by Chicago in line with its persistent policy of trying to magnify every difficulty which the problem presents.

However, if an unusual standard of purity and beauty in the interests of navigation is to be adopted for the Chicago River, then there are available practical measures other than diversion for accomplishing such a standard.

1.

The construction and/or operation of the sewage treatment works so as to provide at least preliminary treatment of storm water overflows up to the capacity of the intercepting sewers.

We have heretofore shown that it is practical to provide at least preliminary treatment up to the capacity of the intercepting sewers or for a total runoff of 4000 c.f.s. (Pages 21-22, *supra*). This will provide treatment for from 267% to 400% of the dry weather flow, depending upon the installation of metering for the water supply. Such a method of operation would practically eliminate pollution from storm overflows. (Gascoigne, J. A. 649.) Defendants'

witness, Fuller, testified that, assuming treatment of 150% of the dry weather flow, the sewage carried in dilution with storm water overflows "will equal about 2% of the total volume of sewage" in the course of one year. (J. A. 551.) This estimate is high; but with at least preliminary treatment of four times the dry weather flow, it is clear that the quantity of sewage which would escape with storm overflows would be negligible, and would necessarily be in a high state of dilution. Rainfalls which would produce any such overflow would have to be large in volume and consequently of very infrequent occurrence.

According to the runoff estimates of Major Putnam, District Engineer, the frequency of any such runoffs would not exceed 7 or 8 times per year. (J. A. 651.) Such overflows would also be of very short duration since they would only be reached during the peak of the runoff and would not obtain during the period of building up the volume, nor during the subsidence of such runoff. The Master refers to a new calculation of frequency of runoff presented by the defendants' witness, Ramey, at the last hearing and alleged to be based on 1929 conditions. (Master's Report 102.) His previous estimates (agreeing with those of Major Putnam) were claimed to have been based upon 1923 conditions. Without determining the increase, if any, in paved area or sewer capacity which are alleged to govern the frequency of such estimated runoffs (J. A. 357, 358-9 the words "not determine" should be inserted after the word "did" in first line page 359 to conform to the record), the witness has in some instances tripled the estimated frequency of a given runoff. (J. A. 351, 421). All of his estimates include a domestic pumpage of from 1500 to 1700 c.f.s. (J. A. 361). He did not determine the duration of the hypothetical runoff from a given rainfall. (J. A. 354-356, 359.) His estimates purported to be based upon a given flow at Lockport when the river became stagnant from some cause up near

the forks, (which General Jadwin testified may be caused at any time by seiches regardless of the amount of diversion.) The water at Lockport had passed from the Lake more than 24 hours before and no part of it was rainfall. (J. A. 357.) Ramey and other witnesses for the Sanitary District have insisted that it would take many hours before an increased flow at Lockport would be felt on the upper Chicago River. (Original Joint Abstract, pp. 126-7 J. A. 436.) If this be true, it is clear that his method of estimating could furnish no basis for his conclusions. Moreover, the testimony shows that it takes from 4½ to 8 hours for the maximum storm water runoff arising from a given rainfall to concentrate. (J. A. 436; Ex. 1, p. 57 Appendix p. 104.) Ramey based his conclusions upon an assumed momentary runoff. (J. A. 356). Obviously an assumed rainfall would have to continue at least 4½ hours before it could concentrate in the River. For rains of shorter duration the runoff at the forks would have disappeared before that of the North Branch arrived. The fallacy of estimating the frequency of runoffs from assumed momentary runoffs arising from a given rainfall is thus obvious. Moreover since the Sanitary District was maintaining a flow at Lockport of approximately 10,000 second feet in 1929, it is difficult to understand how Ramey determined the frequency of the various runoffs below that figure by observing a stagnant condition in the Chicago River. (J. A. 361.) However, it is clear that even on Ramey's computation and with the treatment of 4000 c.f.s. flow, the quantity of sewage spilling into the River would be negligible and in such a high state of dilution as to be innocuous. Certainly its character in that respect can not be determined by the question of whether it is flowing eastward or westward in the River. General Jadwin has testified that there is no reason to fear that occasional storm discharges into the Lake containing untreated sewage in

dilution will render conditions there intolerable for navigation or that the working in and out of effluent would be objectionable to navigation. (Master's Report 108, 109, J. A. 59.)

2.

Circulating water.

If it be contended that the discharge of the effluent undiluted and without flow at Lockport can create any condition of nuisance in the Chicago River, and that it is necessary to add some quantity of water such as 1500 c.f.s. recommended by the Master, 2000 c.f.s. stated by Eddy, or provide a total flow of 3200 c.f.s. as stated by Jadwin, we have heretofore shown that it is simple and practical to provide a circulation of at least 5000 second feet of Lake water (introduced at the head of the North and South Branches of the Chicago River and through the Calumet Sag Channel) through the Chicago River and its auxiliary channels. (*Supra,* pages 27-28.) While it is self-evident that, if a certain quantity of Lake water flowing westward through the Chicago River will insure satisfactory conditions, the same quantity of Lake water flowing eastward through the Chicago River must likewise produce satisfactory conditions in that stream, both General Jadwin and Mr. Howson have testified that the provision of circulating water in such a manner would not only prevent the possibility of any interference with navigation but would restore a thriving fish life, which is not essential to navigation and which has not obtained in the Chicago River for many years. (Jadwin, J. A. 29; Howson, J. A. 110.) This is a complete answer to any claim for necessity of diversion to maintain navigation in the Chicago River as a result of the presence of effluent or storm water overflow.

3.

Practical measures are available to wholly eliminate the effluent of the sewage treatment works and the discharge of any untreated sewage at times of storm from the Chicago River, if that is deemed necessary.

However, if a still higher and more unusual standard of purity is to be adopted for the Chicago River, then practical measures are available to entirely eliminate from the River the suggested sources of contamination, to-wit, the effluent of the sewage treatment plants and the storm water runoff carrying any sewage in dilution. We have shown heretofore in this brief that it is practical to construct outfall sewers from the sewage treatment works so as to discharge the effluent of those plants at remote points in Lake Michigan and remove such effluent wholly from the Chicago River and its branches. (*Supra*, pp. 25-26.) We have heretofore shown that it is practical to construct a separate system of sanitary sewers. (*Supra*, pp. 23-25.) The adoption of the first measure would entirely eliminate the effluent from the River and its branches and prevent any possibility of a nuisance from that source. The construction of a separate system of sanitary sewers would prevent any sewage being carried into the River or its branches by storm water runoff. These two measures, therefore, remove every suggested possibility of a nuisance without any flow at Lockport. With the only alleged possible sources of nuisance thus removed from these channels by such practical measures, there can be no further claim, however fanciful, of any necessity for diversion to maintain navigation in the Chicago River. Complainants consider the adoption of these measures wholly unnecessary in order to maintain navigation in the Chicago River or for any other purpose, but if an unusual standard of purity is to be adopted for those waters or if the elimination of effluent and storm water overflows from those waters is to be made

a condition of the complainants' relief, then the defendants should be required to incorporate these practical measures in their program and carry them out to the end that the diversion may be terminated and the complainants' just rights restored.

D.

In any event no permanent diversion in abridgement of complainants' rights is admissible as a matter of law.

1.

Diversion to remove nuisance created by the sewage of Chicago is not in aid of navigation.

While complainants contend that with completion of the program of available practical measures and no flow at Lockport, no nuisance conditions will be created in the Chicago River or Port of Chicago, they submit that without regard to the question of the existence of a nuisance, the creation of a nuisance by Chicago can not be made the basis of legalizing any diversion of water from the Great Lakes watershed. In the last analysis, such a basis results in a diversion not for the benefit of navigation, but for the purpose of relieving the nuisance from sewage pollution, or in other words, for the purpose of assisting in the disposal of the sewage of the Sanitary District of Chicago which this Court has held may not lawfully be done. In the words of Mr. Chief Justice Taft at 418:

> "Merely to aid the District in disposing of its sewage was not a justification, considering the limited scope of the Secretary's authority. He could not make mere local sanitation a basis for a continuing diversion."

2.

The Congress by general and special legislation has affirmatively determined that the discharge of local sewage and street wash into any of the navigable waters of United States shall not constitute an obstruction to navigation or navigable capacity as a matter of law.

Any contention that the discharge of local sewage and much less of the purified effluent of the sewage treatment works at Chicago will create any obstruction to or interference with navigation in the Chicago River is not only untenable as a matter of logic but it is unsustainable as a matter of law. The material portion of Title 33 U.S.C., Section 407 reads:

> "Deposit of refuse in navigable waters generally. It shall not be lawful to throw, discharge, or deposit, or cause, suffer or procure to be thrown, discharged, or deposited either from or out of any ship, barge, or other floating craft of any kind, or from the shore, wharf, manufacturing establishment, or mill of any kind, any refuse matter of any kind or description whatever *other than that flowing from streets and sewers and passing therefrom in a liquid state,* into any navigable water of the United States, or into any tributary of any navigable water from which the same shall float or be washed into such navigable water."

Title 33, Section 421 is a special Act of similar import applying to Lake Michigan in front of Chicago, and prohibits the discharge of "any refuse matter of any kind or description whatever other than that flowing from streets and sewers and passing therefrom in a liquid state into Lake Michigan" within eight miles of shore.

These statutes constitute both a general and special determination by the Congress that the discharge of street wash and liquid sewage into any navigable water of the United States is legal and does not constitute an interference with or obstruction to navigation or navigable capac-

ity as a matter of law. Since Congress has thus directly authorized the flow from streets and sewers which passes in liquid form to be discharged into navigable water, and has so declared that the same shall not constitute an obstruction to navigation or navigable capacity, it is clear that the same material, modified only by the treatment of the sewage element which takes out the solids and purifies the effluent, can not constitute such an obstruction. In other words, the discharge of the street wash and purified sewage effluents of Chicago are, as a matter of positive statutory enactment, neither an interference with or obstruction to navigation or navigable capacity. This determination by the Congress is conclusive. *Pennsylvania v. Wheeling Bridge Co.*, 59 U. S. (18 Howard) 421; *Southern Pacific Co. v. Olympian Dredging Company*, 260 U. S. 205.

We are unable to find from reading the opinion of *New York v. New Jersey*, 256 U. S. 296, that this statute was construed in that case. Certainly the special statute was not construed. The Federal Government was there seeking to protect government property as well as the interests of navigation. The Government's contention was never decided on the merits. We do not know what would have been the decision of this Court in such an event. That the granting of a petition for intervention is not significant is shown by the action of this Court in this case with reference to the claims of the Mississippi Valley States.

3.

If the Court should find that there is any basis in fact for any diversion subsequent to the completion of the program of practical measures in the interests of navigation, complainants reassert their contentions (laid aside without decision in the opinion of January 14, 1929) that neither the State of Illinois nor the Federal Government has the power to authorize the diversion of any water in the Great Lakes-St. Lawrence watershed to the Mississippi watershed without the consent of the complainant states.

With respect to the absence of power in the State of Illinois or the Federal Government to authorize diversion between these two great watersheds without the consent of the complainant States, complainants refer to the statement of their position, pp. 13-15 *ante*, and in their briefs filed with this Court on the hearing on the exceptions to the Master's Original Report, if the Court should reach a point where it is necessary to decide those principles as a basis of a judgment in this case. However, in further support of the argument appearing at pages 101-109, inclusive, of the brief for complainants in No. 7 Original, filed on the hearing on the exceptions to the Master's Original Report, and in further exposition of the principle that the servitude of riparian property in favor of navigation is a natural servitude confined to the improvement of the watercourse for navigation purposes in its natural location, and not subjecting such riparian property to the sufferance of damages without compensation through the destruction or impairment of such natural waterway for the improvement of another natural waterway in a different watershed, or for the creation of an artificial waterway, complainants cite *Hewitt-Lea Lumber Co. v. King County,* 113 Wash. 431, 21 A.L.R. 201. Complainants also refer to their brief filed in opposition to the Motion to Dismiss which was heard in March, 1926.

E.

The City of Chicago does not divert the unconsumed portion of its domestic pumpage; if it did so, it would have no legal right so to do against the objection of these complainants; and if such a right be conceded for the sake of argument, such a diversion could not be made the basis of diverting an additional quantity of water in derogation of the rights of the complainants.

1.

The City of Chicago does not divert its domestic pumpage.

The Special Master seems to find that the City of Chicago diverts its domestic pumpage from the Watershed. It is said that no injunction is asked against the City of Chicago which is not a party to the suit. (Master's Report 120.) The answer, of course, is that the City of Chicago does not divert its domestic pumpage. The domestic pumpage of Chicago after reasonable use is discharged into the Chicago River and its branches where in the course of nature, and but for the interference of the Sanitary District with the flow of that stream, it would return to the watershed from whence it came. In determining the extent of the abstraction of the Sanitary District, it would be quite as reasonable to exclude some estimate of the pumpage of industries for condensing water and allied purposes. The short answer is that if a decree is entered requiring the Sanitary District to terminate all flow which it alone maintains at Lockport, there will be no diversion. Since Chicago does not divert the unconsumed portion of its domestic pumpage, the question of its power to do so is moot in this case.

2.

Domestic pumpage does not cease to be water because it has become in a greater or lesser degree contaminated through its reasonable use for domestic purposes.

The Master finds that domestic pumpage after its reasonable use is no longer water. (Master's Report 121.) Complainants submit that there is no evidence in the record to support such a finding; and it is not the fact. Large quantities of the pumpage are used for industrial purposes and not for household use. The whole burden of the sanitary testimony in this case shows that the process of sewage treatment is merely the removal of the suspended and settleable solids carried in the water. Because some solid substances or particles are carried in suspension in water it does not cease to be water. It is true that the water may be dirty, unless it is purified by the removal of suspended solids at the treatment works, but dirty water does not cease to be water.

3.

A quantity of water equivalent to the domestic pumpage of Chicago can not be subtracted from the abstraction of the Sanitary District for the purpose of determining its legality.

A substantial part of the flow maintained by the Sanitary District can not be arbitrarily treated as non-existent because the City of Chicago pumps but does not divert a certain quantity of water for domestic purposes. The Master states that the term "diversion" as used by the War Department does not include the domestic pumpage. (Master's Report 120.) That, of course, is a purely arbitrary definition, having nothing to do with the facts. It was erroneously adopted on the assumption that to place a gross limit on the flow at Lockport would place a limitation upon the pumpage of the City of Chicago, which was not a party to the Permit. (See Diplomatic Correspondence; Original

Joint Abstract 181.) It was of course a very illogical definition from the standpoint of the War Department in that it permitted Chicago to increase the diversion as much as it was willing to pump. In granting the recent temporary permit to bridge the gap between the expiration of the Permit of March 3, 1925 and the entry of a decree in this case, the Secretary of War, recognizing this fact, fixed a gross limit on the interim diversion of 7250 c.f.s. plus the 1200 c.f.s., which represented the pumpage when the Permit of March 3, 1925 was granted, with a further reduction to 6500 c.f.s. in addition to the domestic pumpage on July 1, 1930 when additional sewage treatment works will be in operation in accordance with the recommendation of the Special Master. Neither did the Corps of Engineers exclude the pumpage in advising Congress as to the available methods of providing a through waterway with various diversions. (Ex. 18, H. Doc. H. 69th Cong., 1st Sess. Par. 6, 7, 12. Appendix pp. 104-105.)

The Master states that the bills do not challenge either the taking of an unreasonable quantity of water for domestic uses or its diversion from the watershed. (Master's Report 120-121.) That challenge has been asserted consistently throughout this case. In the view of the complainants that neither the defendants nor the City of Chicago have or has the right to divert the unconsumed portion of the domestic pumpage without the consent of complainants, it is immaterial that Chicago pumps an excessive and unreasonable quantity of water. Chicago is presently pumping over 1600 c.f.s. (J. A. 87.) When the Permit of March 3, 1925, was granted the pumpage was estimated at 1200 c.f.s. (Original Joint Abstract 171, J. A. 651; Master's Original Report 73.) The present pumpage is approximately 300 gallons per capita per day, which is obviously not consumed by the inhabitants. (J. A. 641-642.) From one-half to two-thirds of the Chicago pumpage is wasted.

(Ex. 204, J. A. 641-2; Ex. 1, J. A. 651; Def. Ex. 1157, J. A. 652.) Complainants have, however, consistently contended that if the unconsumed portion of the domestic pumpage is to be diverted then Chicago must be compelled to confine its pumpage to a reasonable amount. As to diversion of the unconsumed domestic pumpage from the watershed, any claim of right so to do has been challenged consistently throughout this case, and we do not believe that in a suit between States this Court would require the parties to commence a new suit to settle any issue raised by its application of the law to evidence because of any alleged technicalities of pleading. However, Michigan in No. 11 Original, asked this Court for an order restraining the defendants "from taking or causing to be taken any water from Lake Michigan and its natural tributaries in such manner as to permanently divert the same from the said Lake and said watershed." (Mich. Bill of Complaint, p. 28.) It is difficult to conceive how the right to divert water in any way could have been challenged any more broadly.

4.

The State of Illinois under the circumstances of this case has not the power to authorize Chicago to take its domestic water supply from the Great Lakes Watershed and divert the unconsumed portion to the Mississippi Watershed.

The Master concludes that Illinois has the power to authorize Chicago to take its water supply from Lake Michigan and after reasonable use to divert it to another watershed or otherwise dispose of it. (Master's Report 121; Complainants' Exceptions II-E.) The Master therefore concludes that by virtue of such State authority Chicago has a legal right to take its domestic pumpage from Lake Michigan and that the City may thereafter dispose of the portion of the domestic pumpage which has been used but not consumed as it sees fit. Complainants submit that a State

has no such right under circumstances which make such legislation effective extra-territorially to the damage of other States and that a State can not authorize a municipality to take its domestic water supply from an *interstate* lake or river without returning the portion of said water which remains unconsumed after a reasonable use thereof, where such conduct results in extra-territorial damage. The State of Illinois does not possess the power to exercise eminent domain in these complainant States, much less to take the property rights of the complainant States and their citizens without compensation. Such a procedure invades the territorial integrity and quasi sovereign rights of the complainant States and confiscates the property of their citizens against the will of those sovereignties from whom alone such property rights flow. *Holyoke Water Power Co. v. Connecticut River Co.,* 22 Blatch. 131, 20 Fed. 71; *Saunders v. Bluefield Imp. Co.,* 58 Fed. 133; *Pine v. New York,* 50 C. C. A. 145, 112 Fed. 98 (Reversed on other grounds in 185 U. S. 93); *Rutz v. City of St. Louis,* 7 Fed. 438; *Hoge v. Eaton,* 135 Fed. 411.

However, the defendants now contend that it is the law of the complainant and defendant states that a city located upon a waterway has the right to take water therefrom for all domestic purposes without liability to lower riparian owners, and that under the doctrine of *Kansas v. Colorado,* 206 U. S. 46 and *Wyoming v. Colorado,* 259 U. S. 419, this common rule of law will be applied to a determination of the respective rights of the States in an interstate waterway. Defendants, therefore, conclude that complainant States can not complain of diversion of the domestic pumpage of Chicago after reasonable use by the municipality and its inhabitants.

Complainants do not challenge the right of the City of Chicago to take its domestic pumpage from Lake Michigan, but they do challenge the right of Chicago to divert

from the watershed, after use, that portion of the pumpage not consumed, and much more to adopt a method of diversion of such pumpage from the watershed which shall be made the basis of the appropriation and diversion of an additional quantity of water therefrom. In the view of the complainants the excessive use of water by Chicago is not material, but if the right of diversion of the domestic pumpage were to be sustained, then Chicago should be confined to a reasonable use of water for those purposes through the installation of metering, which would avoid the present waste of from 1/2 to 2/3 of the water pumped. (Ex. 204, J. A. 641-2; Ex. 1, J. A. 651; Def. Ex. 1157 J. A. 652.) The present pumpage is 300 gallons per capita per day, which obviously is not consumed by the inhabitants of Chicago. (J. A. 641-642.) When the permit of Mar. 3, 1925, was granted it was estimated as 1200 c.f.s. (Original Joint Abstract 171). Now it is 1625 c.f.s. (J. A. 87.)

The common law of waters obtains in the complainant and defendant States. Every riparian owner is entitled to the natural flow of the stream or watercourse without substantial diminution in either quantity or quality and an upper riparian owner must return any waters diverted from a water course before it leaves his land. *Kimberly & Clark Co. v. Hewitt,* 79 Wis. 334; *Priewe v. Wisconsin State Land & Improvement Co.,* 93 Wis. 534; *Village of Dwight v. Hayes,* 150 Ill. 237; *Minnesota Loan & Trust Co. v. St. Anthony Falls Waterpower Co.,* 82 Minn. 505; *Pinney v. Luce,* 44 Minn. 367; *Clark v. Pennsylvania R. R. Co.,* 145 Pa. St. 438, 77 Atl. 989; *Miller v. Miller,* 9 Pa. 74, 49 Am. Dec., 545; *Strobel v. Kerr Salt Co.,* 164 N. Y. 303, 320, 58 N. E. 142; *Loranger v. City of Flint,* 185 Mich. 454; *Stock v. Jefferson,* 114 Mich. 357, 72 N. W. 132.

However, the defendants claim that under the law of complainant and defendant States "a city located upon a public navigable waterway has the right to take water

from such stream for its domestic purposes * * * either as a riparian owner or by virtue of a grant by the State of such use of public waters, and no lower or other riparian owner can complain of such use for domestic purposes." (Defendants' Brief before Master on Re-Reference p. 30.) It will be noted at once that this is not the point at issue. The question is not whether the City of Chicago may take water for domestic purposes from Lake Michigan, but whether it may divert from the watershed the portion of the water so taken which is not consumed, or must return it or permit it to return in the course of nature. To determine the soundness of the defendants' contention and of the conclusion of the Special Master, we proceed to a consideration of the law of the respective States in regard to the use of water for domestic purposes.

It will be further noted that the defendants' contention is really a statement of two independent propositions, neither of which is relevant. These two propositions are:

(a) That a municipality situated on any stream, navigable or other vise, may take water therefrom for domestic purposes as a matter of riparian rights even though damage result to lower riparian owners;

(b) That a State may grant a municipality situated upon a navigable stream the right to take its domestic water supply from such public waters without regard to the effect upon lower or other riparian owners.

Assuming the applicability of *Kansas v. Colorado* to a navigable stream and that said case establishes that where the law of a State gives rights to the upper riparian owner as against a lower, such a state can not complain if some rights are given to an upper riparian State as against it, the first proposition is irrelevant, because the question here involved is not whether Chicago may take the water for such purposes but whether it must restore to the water-

shed the unconsumed portion thereof. Assuming the second proposition to be the law of some of the complainant States, it is wholly irrelevant because it does not turn upon riparian ownership, still less upon upper riparian ownership, and therefore, can not be used to give an upper riparian State rights as against a lower.

Before the Special Master the defendants, in support of their contention that it is the law of all the complainant and defendant states that a city may, either as riparian owner or in the exercise of the state's police power delegated to it, take water from a public stream or lake upon which it is located for domestic purposes, and discharge the unconsumed portion of such water as it sees fit; cited the following cases:

Canton v. Shock, 66 O. S. 19; *Minneapolis Mill Co. v. Water Commissioners of St. Paul,* 56 Minn. 485; *Lamprey v. State,* 52 Minn. 181; *Loranger v. City of Flint,* 185 Mich. 454; (quoting dissenting opinion equally divided court). *Appeal of Haupt,* 125 Penna. St. 211; 3 L. R. A. 536; *Philadelphia v. Collins,* 68 Pa. 106; *Phila. v. Commissioners of Spring Garden,* 7 Pa. 348; *Filbert v. Deckert,* 22 Pa. Sup. Ct. 362; *Crill v. City of Rome,* 47 How. Prac. Rep. 398; *Sumner v. City of Gloversville,* 71 N. Y. S. 1088; *Strobel v. Kerr Salt Co.,* 164 N. Y. 303; *United P. B. Co. v. Iroquois P & P Co.,* 226 N. Y. 38; *Champion v. Town of Crandon,* 84 Wis. 405; *Heth v. Fond du Lac,* 63 Wis. 228; *Harp v. City of Baraboo,* 101 Wis. 368; *City of Elgin v. Elgin Hydraulic Co.,* 85 Ill. App. 182.

None of the foregoing cases sustain any right to appropriate a domestic water supply without returning the unconsumed portion thereof to the waterway. Some of them are wholly inapplicable, such as the Wisconsin cases which relate to surface waters.

Considered seriatim, the law of the various complainant and defendant States is as follows:

a.

Ohio.

In Ohio a municipality situated on a natural watercourse is a riparian owner and "has the right to use out of the stream all the water it needs for its own purposes, *returning to the stream all that is not consumed in such use.*" *"The water not consumed in the use or 'legal purpose' must be returned to the stream, or an opportunity given for it to flow back into the stream by the ordinary channels. It can not be lawfully diverted or transported so as to prevent it from flowing back into the stream."* *Canton v. Shock,* 66 O. S. 19, 29, 33.

b.

Michigan.

In Michigan the right of a municipality to take its water supply from a stream to which it is riparian, whether navigable or otherwise, is considered to depend on a determination of the law of riparian rights. The rule in Michigan is that such a municipality can not even appropriate water necessary for its domestic purposes without paying compensation. *Stock v. City of Hillsdale,* 155 Mich. 375; *Loranger v. City of Flint,* 185 Mich. 454 (Dissenting opinion of equally divided court printed first). Obviously, it could not divert the unconsumed portion.

c.

Pennsylvania.

In Pennsylvania the right of a city riparian to a waterway, whether navigable or otherwise, to take its domestic water supply therefrom is the exercise of a riparian right, and the extent of such right is determined by a definition of riparian rights under the law of Pennsylvania. It is the law of Pennsylvania that a municipality situated upon a

navigable or innavigable stream may take all of the water which is reasonably necessary for domestic use without compensation to lower riparian owners, as a reasonable exercise of a riparian right. However, such a city can not take an additional quantity of water to provide water power for the pumpage of the domestic supply at the expense of navigation. *Philadelphia v. Collins,* 68 Pa. St. 106; *Haupt's Appeal,* 125 Pa. St. 211, 3 L. R. A. 536. It has been repeatedly held that the right of a municipality to take its domestic water supply from a stream upon which it is located is no different from the right of any other riparian proprietor to take his domestic water supply. This, of course, does not comprehend the right to take water not consumed into another watershed. Thus it is held in Pennsylvania that a city not situated upon a stream can not by buying a plot of land riparian to such stream acquire the right to take its domestic water supply therefrom to the injury of riparian owners. *Lord v. Meadville Water Co.,* 135 Pa. 122, 8 L. R. A. 202.

d.

New York.

In New York it is held that the State owns the bed and waters of the Mohawk, Hudson and St. Lawrence Rivers and of the portions of the Great Lakes within the boundaries of the State. The riparian proprietors own to the thread of the stream in all other cases. Hence, the State may, as against its citizens, authorize a municipality located on the Mohawk River, the title to the bed and waters of which is in the state, to appropriate such waters to public purposes, such as a domestic water supply, without compensation. *Crill v. City of Rome,* 47 How. Prac. Rep. 398. However, the right of a municipality on the other streams, of which the title to the bed and flowing

water is not in the State, is merely that of a riparian owner, and if the city takes a quantity of water which causes immediate, perceptible damage to a lower riparian owner, compensation must be paid. *Sumner v. City of Gloversville,* 71 N. Y. S. 1088. None of the cases sustain a diversion from the watershed or the deprivation of lower riparian owners of unconsumed portions of the domestic water supply. It has been expressly held that the State can not authorize a city to take water from a lake to which it is not riparian without providing compensation. *Smith v. Rochester,* 92 N. Y. 463. See also *Fulton Light H. & P. Co. v. State,* 200 N. Y. 400, and note in 37 L. R. A. (N.S.) at 312.

e.

Minnesota.

In Minnesota the law is that a municipality can only appropriate the waters of a private or innavigable stream for domestic use upon payment of compensation, but that the State, as the owner of the beds and waters of large, navigable streams, can appropriate or authorize the appropriation of their waters for public use, such as a municipal water supply, as against its citizens, without compensation. *Minneapolis Mill. Co. v. Water Comm. of St. Paul,* 56 Minn. 485.

There was no authority that a municipality in Minnesota may divert to another watershed the water taken for its domestic water supply but not consumed in that use.

f.

Wisconsin.

Defendants have cited no authority in point and we are able to find none. Clearly there is no authority which would sustain the right of a municipality in Wisconsin

riparian to a watercourse to divert that portion of the domestic pumpage which has not been consumed to another watershed, or to do other than to return or permit it to return to its natural watercourse in the usual and ordinary way. Generally, Wisconsin cases rigidly uphold the common law right of a lower riparian owner to the natural flow of the stream without substantial diminution in quantity or quality. *Kimberly & Clark Co. v. Hewitt,* 79 Wis. 334; *Priewe v. Wisconsin State Land & Improv. Co.,* 93 Wis. 534. Even the state can not use the waters in the same watershed so as to interfere with lower riparian owners, except in aid of navigation. *Green Bay & Co. v. Kaukauna Water Power Co.,* 90 Wis. 370.

g.

Illinois.

In support of their proposition the defendants have heretofore cited *City of Elgin v. Elgin Hydraulic Co.,* 85 Ill. App. 182 (affirmed 194 Ill. 476). The holding relied upon merely is that the public residing along the Fox River may take its domestic water supply without regard to the effect upon water powers of lower riparian owners. This, of course, has nothing to do with the right or duty of a municipality as a riparian owner to return the portion of the domestic pumpage not consumed to the waterway. Moreover, the statement in the case is purely *obiter* since the complainant was not an interested riparian proprietor.

From a consideration of the law of the complainant and defendant states, it is submitted that there is no authority for the claim that a city located upon a watercourse may divert that portion of the domestic pumpage which is not consumed instead of permitting it to return to the waterway in the course of nature. Such a proposition is directly contrary to the law of Michigan where the right of the city even to use the waters of such a stream for domestic

supply without compensation is denied. It is directly contrary to the law of Ohio where it is specifically held that the portion of the domestic pumpage of a riparian city not consumed must be returned or permitted to return in the course of nature to the waterway from whence it was taken. We think that this is the unquestioned rule of the common law. We, therefore, submit that the City of Chicago has not the right to divert that portion of the domestic pumpage which is not consumed to another watershed to the detriment of the complainant States and their people.

It is clear that as against those states where the right to take a domestic water supply is purely a riparian right subject to the corresponding obligation to return the unconsumed portion thereof to the waterway, Illinois can claim no right to divert the unconsumed portion of the domestic pumpage at Chicago under the doctrine of *Kansas v. Colorado*, which holds that if a complaining state is accorded the same rights in an interstate waterway as are provided by its laws, it has no just cause of complaint. Neither can Illinois divert a portion of the water of an interstate waterway in that way as against states which hold that the state is the owner of the beds and flowing water of large navigable streams in the nterests of the public, and that the state (as such owner) can, as against its citizens, take the waters thereof for any public purpose without compensation. Such a rule of law does not furnish any basis for the appropriation by an upper state of the waters of an interstate watercourse to the injury of such other state. So far as the property rights of riparian owners of such streams are concerned the fact that the state may take the waters without compensation for a public purpose is immaterial in the application of that principle. The principle of these cases of public right in a state is that the title to the bed of navigable streams and the transitory title to the flowing water is in the state. It is the property of the state; and

for that reason, as a matter of intrastate law, and as a matter of conflict between the state and its citizens, the state may take the water as its own property. However, assuming that principle to prevail in two states bordering upon an interstate waterway, it by no means follows that the upper riparian state can therefore appropriate the waters of the interstate stream to the prejudice of the rights of the lower riparian state in that stream. Under the riparian right theory the upper state would be taking the property of the citizens of the lower state derived from such state as a sovereign. Under the state title theory the upper state would be taking the property of the lower state. The upper state has no greater right to take the property of the lower state than of its citizens and vice versa. The determination of whether the property rights in such stream shall be vested wholly in the state, or shall be vested partly in the state and partly in the riparian ownership of its citizens is merely a promulgation of the law of property in the state. It is a wholly immaterial question in determining the respective rights of states in an interstate watercourse under the doctrine of *Kansas v. Colorado* and *Wyoming v. Colorado*. Under that doctrine it must appear that by the law of both states certain advantages are given to an upper riparian owner against a lower riparian owner, and that the advantages which are claimed by the upper riparian state do not exceed the advantages which are accorded to an upper riparian owner by the law of the complaining state.

The manner in which a state by its law divides the property rights in flowing streams, either navigable or innavigable, between that state and its citizens is not material in determining the respective rights of states in interstate streams. That determination depends upon the relation of the total property rights in one state vested by its law in such state and in its citizens in comparison with the total

property rights in such a waterway vested by the law of the other state in such state and its citizens. As they are determined the upper riparian state can not infringe them.

5.

Assuming arguendo, that the City of Chicago does divert and has the general right to divert the portion of the domestic pumpage not consumed, it can not adopt a method of diverting such pumpage which involves the abstraction of an additional quantity of water in derogation of complainants' rights.

In this case it is sought to take an additional quantity of water from the Great Lakes watershed to assist in the disposition of the portion of the domestic pumpage not consumed by transportation to another watershed. No matter how broadly the right to dispose of the unconsumed portion of the domestic pumpage may be considered, it can not justify the taking of an additional quantity of water. In short, the defendants can not select a method of disposition of the unconsumed portion of the domestic pumpage which designedly, or otherwise, involves a further abstraction of water. Such further abstraction is not part of the domestic water supply, nor is it in the exercise of any right to take such a supply. It is analogous to taking an additional quantity of water for power purposes in order to furnish the power to pump the domestic supply. This is inadmissible. *Philadelphia v. Collins*, 68 Pa. St. 106. There is no difference, either in fact or law, between taking additional water to provide power to pump the domestic supply and the taking of additional water for the purpose of carrying away in dilution the unconsumed portion of the domestic supply.

III.

THE MASTER COMMITTED NO ERROR IN NOT ALLOWING A LONGER PERIOD OF TIME FOR THE CONSTRUCTION AND PLACING IN OPERATION OF THE PRACTICAL MEASURES RECOMMENDED BY HIM.

Defendants, in their Exceptions Nos. 3 and 4, assert that the Master erred in not allowing a longer period of time for the completion of the practical measures, because, due to high rainfall during the past two years, levels of the respective Great Lakes are higher than when the Master filed his original Report on November 23, 1927. It is alleged that this presently minimizes the damages which are being sustained by the complainants, and that therefore, a longer period of time should be allowed to the defendants. This contention is wholly untenable for two reasons:

First,—the Master has allowed until December 31, 1938, a period of 9 years, for the completion of the recommended practical measures. It is, of course, obvious from the testimony in this case, and from the circumstances cited by the defendants, that by December 31, 1938, levels of the various Great Lakes may be lower than they have ever been. If the Court were to grant some additional period of time because of present high lake levels, it might very well happen that such additional period of time beyond 1938 would coincide with lower lake levels than have ever been experienced, and hence result in greater annual damages during such period than have been sustained during any of the past years.

Second,—the contention of the defendants erroneously construes the equitable principle upon which this Court allowed the defendants any period of time for the completion of practical measures before termination of the illegal diversion. The court said that "in keeping with the principles

upon which courts of equity condition their relief, and by way of avoiding any unnecessary hazard to the people of that section, our decree should be so framed as to accord to the Sanitary District a reasonably practicable time within which to provide some other means of disposing of the sewage." The measure of such reasonably practicable time is the necessities of the defendants, and not the extent of or fluctuations in the annual damages of the complainants. In short, the principle invoked is in the nature of an equitable defense *pro tanto;* and the defendants must establish the extent of that defense by proof of their necessities, and not by offering to show a temporary diminution in annual damages to the complainants.

Defendants' Exception No. 5 simply asserts that the Master erred in not accepting the maximum estimates of time made by defendants' witnesses as the reasonable period of time required for the construction of the various sewage treatment works. Defendants thereby assert that the Master should have ignored all other testimony in the case. We think that a reading of the second section of the Master's Report (pp. 35-83, incl.) demonstrates that the Master was very liberal in his allowance of time. We think that an examination of all of the evidence in the case on this point would demonstrate the extreme liberality of the Master even more clearly. We regard it as unnecessary to further comment upon this Exception.

Defendants in Exception No. 6 assert that the Special Master erred in not allowing a longer period of time because of delays "incident to acquiring sites for plants" and incident to delays in raising funds for public work. Notwithstanding the use of the plural, a site for every one of the plants described by the Special Master was long ago acquired, with the exception of the Southwest Side plant. (Master's Report pp. 45, 48, 50) That has long been selected, and counsel stated in the course of the hearings on

Re-Reference that proceedings were being initiated to acquire it. The Master has allowed a period of 2½ years for the necessary preliminary steps for the Southwest Side plant, including the acquisition of a site. (Master's Report 58) We think an examination of the evidence will disclose that this was a very liberal allowance. The Special Master allowed an additional period of one year solely as a concession to any delays incident to the raising of funds for this work. (Master's Report 80) While complainants have not excepted to this allowance, they believe that it is not justified under the facts or law; and it certainly can not be criticized as an insufficiently liberal concession to the defendants.

IV.

THIS COURT HAS ALREAY DECIDED (WISCONSIN, ET AL. v. ILLINOIS, ET AL., 278 U. S. 367) THAT IT HAS THE JURISDICTION TO DETERMINE THE EXTENT OF DIVERSION, IF ANY, WHICH IS LEGAL, AND ITS RIGHT SO TO DO IS CLEAR.

By their Exception No. 7 the defendants assert that the Special Master erred in failing to conclude that this court had no power to fix the extent of diversion which would be legal from time to time pending the construction of the practical measures, or the final diversion, if any, which would be legal, upon the completion of the practical measures. They thereby, in effect, assign error because the Master carried out the mandate of this Court on Re-Reference. The Master was specifically directed to find the facts with respect to the reductions in the diversion which might be had from time to time during the construction of the program, and whether any diversion would be necessary to maintain navigation in the Chicago River after the completion of the program. By this assignment of

error defendants challenge the decision of this Court in *Wisconsin, et al. v. Illinois, et al.*, 278 U. S. 367, and assert that the Master should likewise have refused to be bound by it, and, in effect, should have overruled it. If defendants deemed the previous decision of this Court erroneous they should have petitioned for a re-hearing, pointing out the alleged error. This contention has been raised throughout this litigation, and was finally disposed of and set at rest by the previous decision of this Court in this case.

This Court held that this diversion had no legal basis except to the extent, if any, that any flow should be required to maintain navigation in the Chicago River after completion of the program. The determination of all of these questions was a determination of fact as the basis of a dedetermination of law, which is obviously a justiciable question. If this Court has no jurisdiction to determine the factual basis of the power and jurisdiction, either of the Secretary of War or the Federal Government, then it is idle to invoke the jurisdiction of this Court to protect either states or citizens from usurpation of power on behalf of either. This Court has the jurisdiction to determine the power of the Federal Government or any Federal officer to act, and if the extent of that power depends upon a determination of fact, it requires no argument to show that such facts may be determined by the Court as part of its jurisdiction. It is exactly the same kind of determination as was made in *United States v. Rio Grande Dam & Irrigation Co.*, 174 U. S. 690, where this Court directed the lower court to determine the amount of water which might be appropriated from innavigable portions of the Rio Grande River by an Irrigation Company without substantial damage to the navigable portions of that river, and to thereupon enjoin the abstraction of any larger quantity of such waters.

V.

THE MASTER COMMITTED NO ERROR IN NOT ALLOWING AN ADDITIONAL DIVERSION IN THE ALLEGED INTEREST OF NAVIGATION IN THE CHICAGO RIVER AND THE ILLINOIS AND MICHIGAN CANAL.

By their Exceptions Nos. 10 and 11 defendants allege that the Master erred in not allowing some additional quantity of water in the alleged interests of navigation, or of the improvement of navigation along the Illinois River and the Illinois and Michigan Canal. The alleged desirability of such an allowance is apparently predicated upon some plan of improvement which the defendants would prefer to have adopted for those waters. It is unnecessary to debate the merits of the plan apparently desired by the defendants as compared with other plans of improvement involving little or no diversion of water. This Court specifically held, in *Wisconsin v. Illinois*, 278 U. S. 367, at 417, that Congress, if it had the power, had never undertaken to authorize any diversion of water for navigation purposes to or along these waters, and that no diversion for such purposes could be allowed in this case. 278 U. S. 367, at 417. The Master specifically found that there had been no action by Congress subsequent to the previous decision of this Court (Master's Report 122). Again, in effect it is alleged that the Master erred in not undertaking to overrule this Court.

VI.

DEFENDANTS' CONTENTION THAT THE MASTER ERRED IN FAILING TO FIND THAT IT IS PRESENTLY IMPRACTICABLE TO DETERMINE THE PERMISSIBLE REDUCTIONS IN THE DIVERSION DURING THE CONSTRUCTION PERIOD, OR ON THE CONCLUSION OF THE PROGRAM IS WITHOUT MERIT.

Defendants' Exception No. 13 asserts that the Special Master should have found that he was unable to answer the question submitted to the court with reference to the reductions in the diversion which would be practical from time to time during the construction period, and whether any diversion would be necessary in order to maintain navigation in the Chicago River upon the completion of the program. They also reiterate in effect the claim that this Court should abdicate its jurisdiction in this case and turn it over to the Secretary of War for determination. This has already been covered in connection with the discussion of defendants' claim of lack of jurisdiction in this Court. The initial reduction prescribed by the Special Master is sustained by the testimony of the witnesses for both complainants and defendants. (Master's Report 83-105, incl.) The Secretary of War has incorporated this finding in his Interim Permit covering the period between the expiration of the Permit of March 3, 1925 and the entry of the decree in this case. While there is much evidence supporting the Master's finding as to the initial reduction which is necessarily not reviewed in his Report, we think it unnecessary to burden the Court with a reference thereto because the finding is so overwhelmingly supported by the evidence, and is, in fact, substantially uncontradicted. With respect to the question of what diversion, if any, is necessary to maintain navigation in the Chicago River after the completion of the

practical measures recommended or available for the disposition of the sewage of the District without diversion, complainants submit that the evidence which has heretofore been discussed in Part II of this brief (Pages 38 to 73 *ante*) not only establishes that it is practical now to determine whether any diversion will then be necessary to maintain navigation in the Chicago River, but conclusively shows that no diversion or flow at Lockport will be in fact necessary to maintain navigation in that River, and that in fact the available practical measures will provide conditions in that river far superior to those ordinarily considered necessary or achieved to maintain navigation in the principal ports of the United States.

VII.

THE SPECIAL MASTER SHOULD HAVE RECOMMENDED THAT COSTS BE TAXED AGAINST THE DEFENDANTS INCLUDING THE FEES OF THE SPECIAL MASTER.

On the previous decision in this case the court found that the defendants had for many years maintained an unlawful diversion in contravention of the rights of the complainants, and that through such illegal action on the part of the defendants, the complainants had sustained great damages to their navigation and commercial interests, to structures, to the convenience of summer resorts, to fishing and hunting grounds, to public parks and other interests, and to riparian property in general. 278 U. S. 367, at 407-9. The complainant States were compelled to prosecute long and expensive litigation to vindicate their rights and the rights of their citizens. It was not a suit involving "one of those governmental questions in which each party had a real and vital, and yet not a litigious interest" (*Nebraska v. Iowa,* 143 U. S. 359, 370). These suits involved interests which entitled the complainants to costs upon an adjudication that their complaints were meritorious. (*South Dakota v. North Carolina,* 192 U. S. 286, 321.) Apparently if complainants' appeals had not been meritorious, costs would have been adjudged against them as they were charged against New York in the case of *New York v. New Jersey,* 256 U. S. 296, 313. There is no instance of such vast injuries being suffered with such great patience as has been exhibited by the complainant states and their peoples in connection with this controversy. All other recourse failing, they were compelled to resort to litigation before this Court. Their right to relief has been sustained; and we regard it as clear under the decisions of this Court that they are entitled to a recovery of their costs from the defendants. (*North Dakota v. Minnesota,* 263 U. S. 583.)

For the foregoing reasons the exceptions of the complainants should be sustained, the Master's Report should be amended in accordance with the prayers of the complainants, and the decree as tendered by them entered.

Respectfully submitted,

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APPENDIX.[1]

The following is an extract from page 14 of Exhibit 102 entitled: "Statistics Relating to the Freight Commerce of the Great Lakes, the Chicago River, the Chicago Sanitary Drainage Canal and the Illinois River."

To the statistics for the Chicago Drainage Canal for 1924 there is appended the note:

> "A few large manufacturing companies, one oil company, and one public utility corporation, maintain storage plants along the waterway, and the commerce consists largely in the removal of material from these storage plants and quarries to distributing stations in the city of Chicago.
>
> The Sanitary District estimates that an average of one vessel a week—launches, canoes, and row-boats—used the canal during the navigation season."

A note practically identical with the above is appended to the 1925 statistics.

To the 1923 statistics there is appended the note:

> "Practically all of this material except spoil bank stone was transported by the owners in their own floating plant. The spoil bank stone was transported by local contractors, using their own scows and tow boats.
>
> The lockage records of the Sanitary District show that 133 vessels—mostly launches and other pleasure boats—passed through the lock at Lockport during the year 1923.
>
> The 1925 traffic of the drainage canal consisted of 659,568 tons of stone and 28,527 tons of gasoline and other oils; the 1924 traffic of 479,637 tons of stone and 51,280 tons of oils, and the 1923 traffic of 364,889 tons of stone and 47,162 tons of oils."

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[1]This appendix is added, pursuant to agreement of counsel, to set forth for the convenience of the Court certain items of evidence to which reference is made in the foregoing brief, and which were inadvertently omitted from the Joint Abstract.

John W. Woerman, called by defendants on Original Reference. Principal Assistant Civil Engineer in the United States District Engineering Office at Chicago.

(Record 4200). "There is no through commercial traffic between the Des Plaines River and Lake Michigan that I know of at the present time. There has been no through traffic over the Sanitary & Ship Canal since it was opened that I am familiar with, but during 12 or 13 years of that period I was in the St. Louis office and very possibly there was some that I did not know about. It is possibly true that there could not have been such traffic in very considerable amount and I not know of it."

Extracts from Defendant's Exhibit 1157, entitled: "Report of the Engineering Board of Review of the Sanitary District of Chicago on the Lake Lowering Controversy and a Program of Remedial Measures":

12. Turbidity—An intensive study by the Department of Health for the nine months from February to October, 1924, shows that turbidities of 50 parts per million or more occur at all of the cribs, with a duration of two to seven consecutive days for the cribs off the Chicago River front. Turbidities were more than 20 parts per million in some months for 50 to 90 per cent of the time. The highest turbidity of 100 parts per million was reached at the Two-Mile crib. Table 7 shows the monthly average turbidities, and Table 8 the relation of turbidities at the several cribs.

13. Observations at the Two-Mile crib by the staff of the city engineer between the years of 1915 and 1923 show that in some months the turbidity was 50 parts per million for a little over 50 per cent of the time, and that the turbidity of 50 parts per million or more was continuous in one month for 10 consecutive days. These high turbidities occur annually for from three to seven consecutive days. Rarely was the turbidity at this crib less than 10 parts per million, an amount easily dis-

cernible in a drinking glass. Table 9 shows the duration of continuous periods of relatively high turbidity at the Two-Mile crib. (Ex. 1157, pp. 25-26.)

George B. Gascoigne, recalled by Complainants on Re-Reference. A sanitary engineering expert.

DIRECT.

My attention is directed to the statements of witnesses for defendants that the sewage problem at Chicago amounts to providing treatment for a population of about 7,000,000 people. If the size of the sewage disposal problem at Chicago (10679) is measured on the same basis as is ordinarily used in measuring the sewage problems of other cities (10680), the Chicago Sanitary District problem is the treatment of the sewage of a population of 4,785,000 in 1945 as set forth on page 113 of part 3, Appendix 1, Board of Review Report, entitled, "Sewage Disposal." As of that date the industrial load is given roughly as 40 per cent. There is nothing unusual or unique in such a proportion of industrial load in a sewage problem. (Complainants' Abstract, pp. 15-16.)

CROSS EXAMINATION.

When I stated that it is quite usual to find industrial waste loads of from 30 to 50% additional to the human population sewage load I had in mind, from personal experience, the West Side Treatment Works at Cleveland. There are other cities such as Milwaukee, Madison and (11140) Indianapolis. Any engineer who is specializing in sewage treatment work is acquainted with what is going on at Milwaukee, Chicago and Indianapolis as regards activated sludge treatment. I refer to my experience in the design of the plant at the West Side in Cleveland, serving 200,000 persons, with an industrial load from stockyards of approximately 100,000, if not a little more. (Defendant's Abstract, p. 335.)

(11199) The industrial load at the Southwest Side Plant expressed in equivalent population as of 1945, is 100%, the human population (11200) served by that plant to be 1,200,000 people. I do not know of any sewage disposal plant of this size. The largest is the North Side Plant at Chicago, with (11203) designed capacity of 830,000 people. The capacity may be increased some, under certain conditions of operation. (Defendant's Abstract, p. 349.)

Extract from Exhibit 1 entitled: "Diversion of Water from Lake Michigan" by Major Putnam, District Engineer, November 1, 1923.

"Were it not for the inertia of the water in the canal it would be possible to divert only 4,167 cubic feet per second regularly, and, upon due warning, increase the diversion to any necessary amount. But while a heavy storm can concentrate in 6 to 8 hours it generally takes 12 to effect any appreciable increase in flow through the Chicago River by opening the gates at Lockport so that the river might discharge into the lake for several hours before flow toward Lockport could be re-established. (p. 57) (Complainants' Abstract, p. 370.)

Extracts from Exhibit 18, House Document No. 4, 69th Congress, 1st Session, entitled: "Report of the Board of Engineers for Rivers and Harbors on Illinois River, Illinois" dated March 29, 1926.

"6. The resolution next calls for answers to four specific questions. These questions are listed and answered successively below:

Question 1. What is the estimated cost of channels each 200 feet wide and of depths of 7, 8, and 9 feet, from Utica to the mouth of the Illinois River, on the basis of assumed diversions of water from Lake Michigan of 2,000, 3,167, 7,500, 8,500 and 10,000 second-feet?

7. Before answering the question, it is necessary to define what is meant by 'diversion.'

(a) The word is used in the district engineer's report and in the present report, unless otherwise stated, to mean the flow in the drainage canal at Lockport. It consists of two parts: (1) The water withdrawn from Lake Michigan for Chicago's water supply, and delivered into the river after use. (This at present is about 1,400 cubic feet per second, but after the metering of the city's water it is expected to be reduced to about 900 cubic feet per second.) (2) All the rest of of the flow, which is considered as the diversion of the Sanitary District of Chicago, and is limited by a War Department permit." (Ex. 18, pp. 8-9.)

* * * * *

"12. The resolution requires the submission of estimates for improving the Illinois River to given dimensions for each of several 'assumed diversions of water from Lake Michigan.' It is supposed that by 'diversions' the Committee on Rivers and Harbors meant 'annual average flows at Lockport,' for it is the flow at Lockport that is inclusive of all diversions from Lake Michigan at Chicago, and it is the annual average flow that is effective as regards the levels of the Great Lakes." (Ex. 18, p. 21.)

"42. The total amount of pollution increases directly with the population and with it the danger of typhoid infection. But if the water intakes are moved farther from the source of pollution, the degree of pollution decreases almost as the cube root of the distance moved. In other words, if Milwaukee conditions, with the intake located 5 miles north of the discharge of the sewage treatment plant, will produce a death rate of not over 2 per 100,000 by 1930, the same system with an intake located 10 miles from the mouth of the Chicago River should produce equal results for Chicago, assuming 85 per cent or better treatment of all the sewage; for while the population involved is seven times as great, doubling the distance between intake and discharge should give eightfold protection, due regard being had to prevailing currents in the lake in the selection of location of the intakes." (Ex. 18, pp. 222-3.)